BT-7130

SERVICE MANUAL AND PARTS LIST CATALOG

7130

NO. 2 CUTTER AND TOOL GRINDER

CINCINNATI MILACRON

SERVICE MANUAL AND PARTS LIST CATALOG

7130

FOR

CINCINNATI ®

No. 2 CUTTER AND TOOL GRINDER

MODEL DO

This catalog was prepared for two primary reasons. First to expedite the ordering of repair parts for your Cincinnati No. 2 Cutter and Tool Grinder; secondly, to present the correct methods of servicing to those responsible for keeping the machine running.

Due to continuing improvements in design, it is possible that some information or the appearance of component parts to be found in this catalog may vary slightly from the machine delivered to you. This indicates that the mechanism has been improved to better fulfill your requirements.

PRICE PER COPY $10.00

NOTE: DO NOT ATTEMPT TO OPERATE THIS MACHINE UNTIL YOU HAVE READ THIS MANUAL THOROUGHLY.

CINCINNATI MILACRON

Machine Tools | Process Controls | Chemicals | Plastics
Plastics Processing Machinery | Abrasives

PUBLICATION NO. M-2791-1

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The design and specifications of these machines and attachments illustrated and described herein are subject to change without notice.

PUBLICATION NO. M-2791-1

LIST OF ILLUSTRATIONS

NOTE: As reference aid, Figure numbers are the same as the page numbers on which they appear. As an example Figure M3 appears on page M3.

SAFETY PRECAUTIONS

PROTECT YOUR EYES

Always wear safety glasses or an approved eye shield when operating a grinding machine.

ALWAYS USE A WHEELGUARD

Be certain that the grinding wheel is shielded by the correct wheelguard before starting the machine.

INSPECT GRINDING WHEELS CAREFULLY

Immediately upon receipt, all grinding wheels should be closely inspected to be sure that they have not been damaged in transit.

Before mounting a vitrified grinding wheel, test for cracks as follows: suspend the wheel over a pin through the mounting hole. Tap the periphery of the wheel lightly with a non-metallic implement. An undamaged wheel will emit a clear metallic ring. Resinoid and other organic bonded wheels will not "ring" and must be given a careful visual inspection before use.

NOTE: *Handle all grinding wheels with care to prevent dropping or bumping.*

STORE GRINDING WHEELS IN A CLEAN DRY AREA

Store as close to the machine as possible. Racks, bins or drawers should be provided for safe storage and easy access. The storage area should not be subjected to extremes in temperature or humidity as these conditions sometimes affect resin bonds.

NOTE: *A separate mount is recommended for each wheel in regular use.*

MOUNTING THE GRINDING WHEEL

Read the instructions on mounting grinding wheels, pages M12 - M15.

GRINDING WHEEL SPEED

NEVER RUN A GRINDING WHEEL FASTER THAN THE MAXIMUM SAFE OPERATING SPEED. Grinding wheels are clearly marked with a maximum safe operating speed. This marking appears on the side of the wheel, or on the blotter attached to the wheel. This marking tells, in revolutions per minute, the maximum safe speed at which the grinding wheel may operate at its maximum diameter.

Also refer to the current American National Standards Institute, Inc. publication B7.1 1964 entitled "The Use, Care, and Protection of Abrasive Wheels."

After the grinding wheel has been properly mounted, start the spindle and let it run for a full minute at operating speed before attempting to grind. WHEN STARTING THE SPINDLE, DO NOT STAND IN THE GRINDING WHEEL'S PLANE OF ROTATION.

GENERAL OPERATING RULES

Peripheral grinding wheels should not be used for side grinding because of insufficient support to withstand the pressures exerted. Side grinding shall only be performed with wheels designed for this purpose. Grinding on the flat sides of straight wheels is often hazardous and should not be allowed, especially when the sides of the wheel are appreciably worn or when any considerable or sudden pressure is brought to bear against the sides. Type 6, 11 and 12 wheels are used for side grinding.

Do not "feel" a rotating grinding wheel with a finger to determine the smoothness of the wheel.

Use only grinding wheels of the size and type described on page M10.

Special collets and spindle drive pulleys are required for 8" diameter grinding wheels (see page RP8).

All machines, except those equipped with a mist coolant attachment should be fitted with a dust exhaust system.

WARNING

Do not wear rings, long ties, wrist watches or loose long sleeved shirts when operating this machine.

FUNCTIONAL DIAGRAM

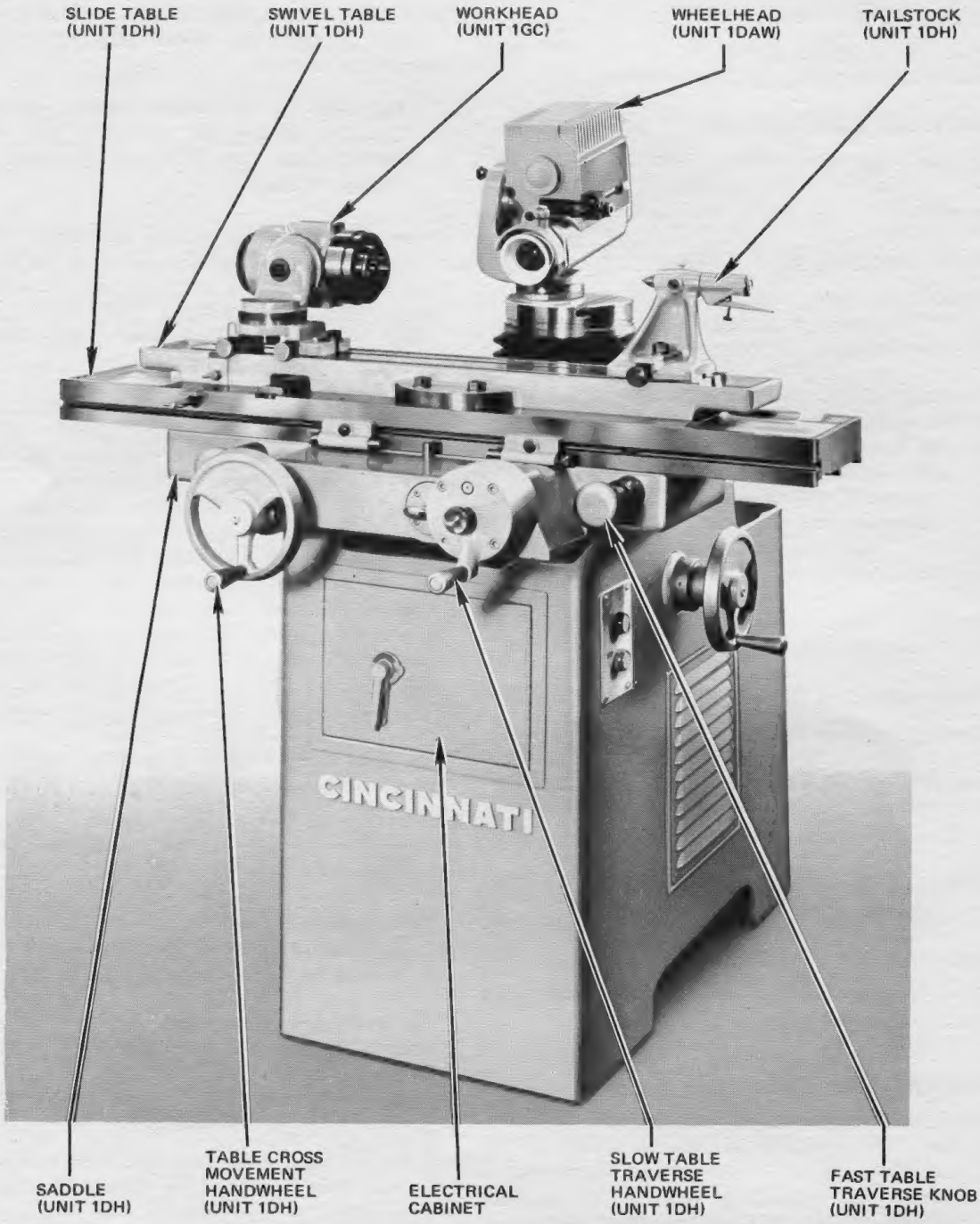

Figure M2
RIGHT FRONT OF STANDARD MACHINE

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FUNCTIONAL DIAGRAM

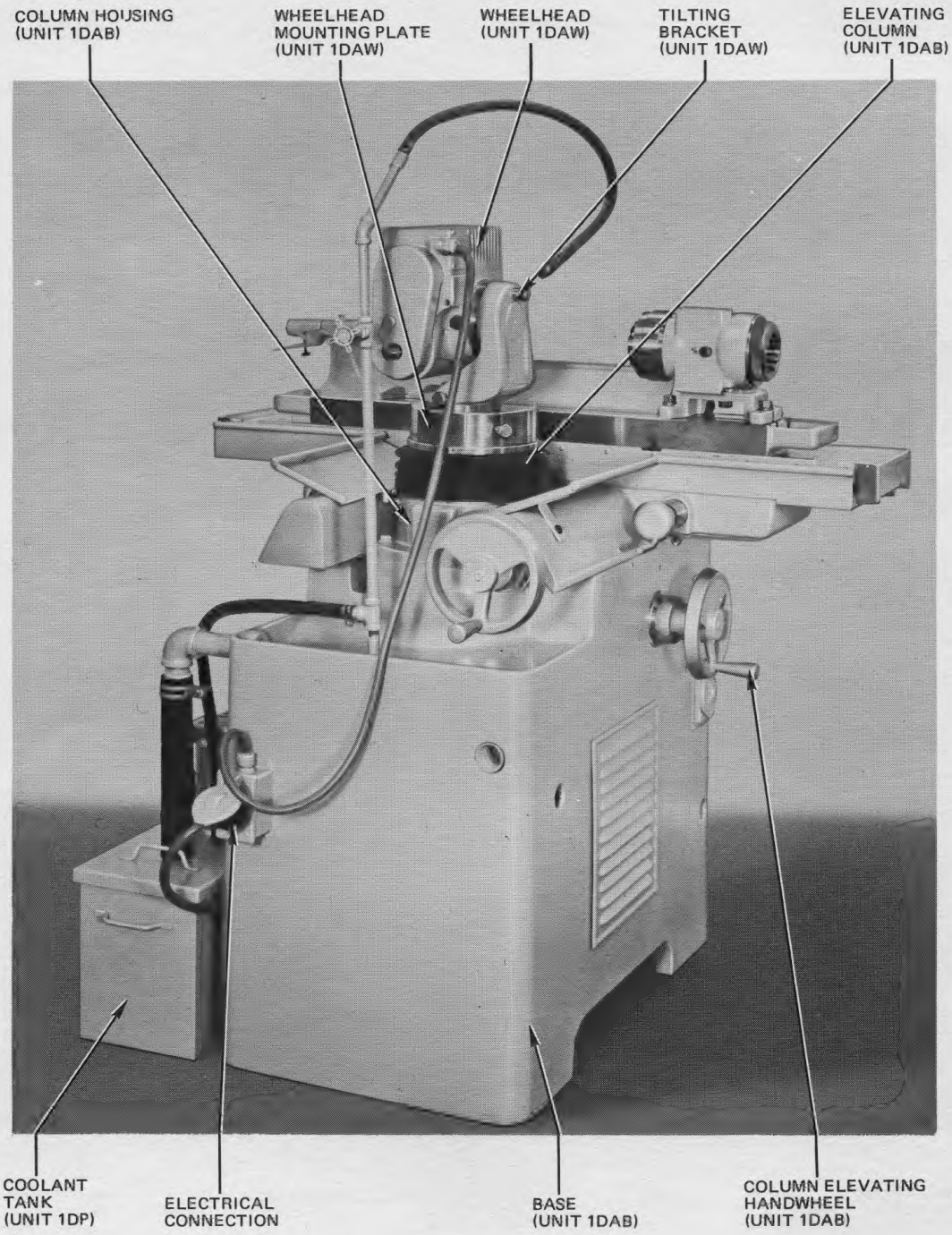

Figure M3
REAR OF STANDARD MACHINE

10256-1

FUNCTIONAL DIAGRAM

Figure M4
RIGHT FRONT OF MACHINE WITH POWER TABLE TRAVERSE

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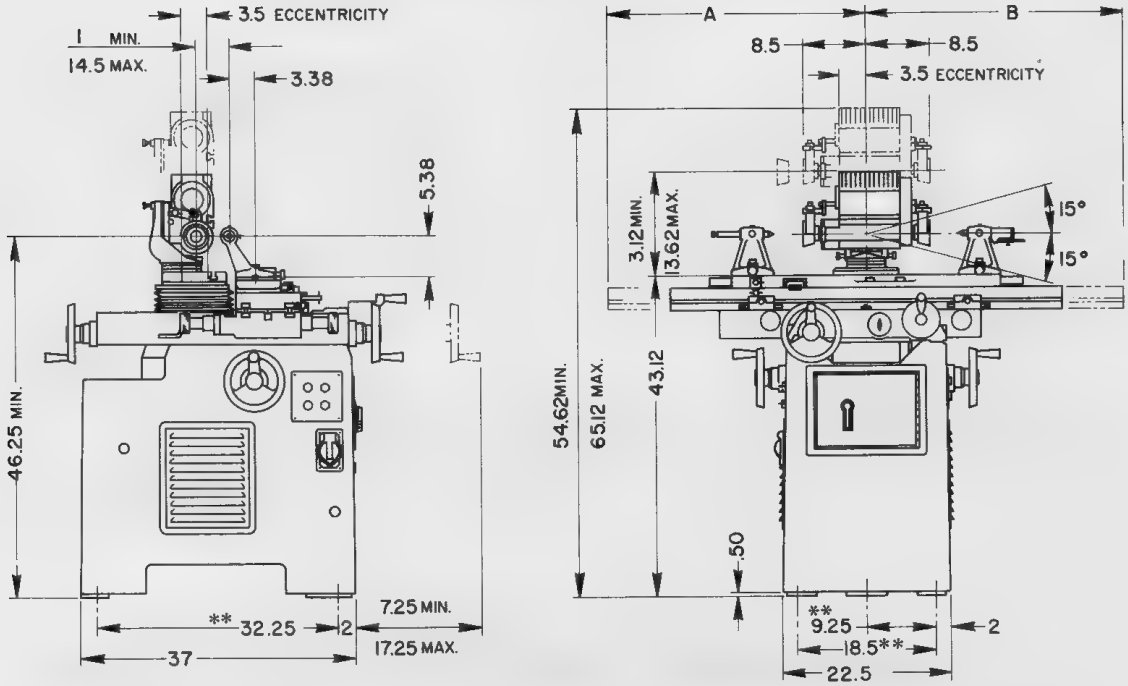
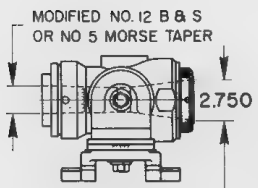
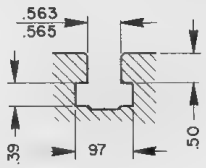
FUNCTIONAL DIAGRAM

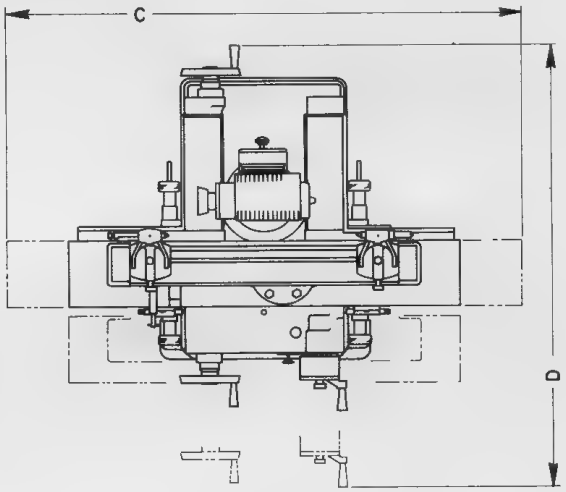
Figure M5
RIGHT REAR OF MACHINE WITH POWER TABLE TRAVERSE

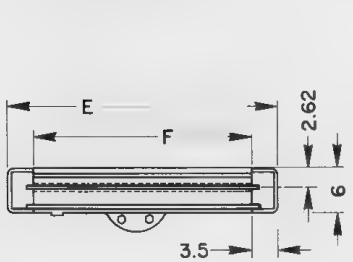
DIMENSIONAL DRAWING











MACHINE	A		B		C	D	E	F
	MIN	MAX	MIN	MAX.				
16"	20 1/2	36 1/2	16	32	68 1/2	55 5/8	43	36
24"	23 3/4	47 3/4	19 1/4	43 1/4	91	55 5/8*	51	44

*WITHOUT POWER FEED 71" WITH POWER FEED

**Dimensions for Bolting Machine to Floor

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INSTALLATION INSTRUCTIONS

FOUNDATION

A special foundation is not required. Any substantial floor, wood or concrete, fairly flat, and sufficiently heavy to withstand the weight of the machine, will be satisfactory. However, do not locate the machine close to vibrating equipment, as vibration transmitted to the machine will result in a poor finish on the cutting edge of the cutter being sharpened.

The effects of a vibrating foundation may be reduced or entirely eliminated by mounting the machine on a rubber base 3/8" or 1/2" thick. This base may be made by placing a good grade of oilproof rubber between two thin steel sheets. Of course, the rubber selected should have sufficient unit strength to withstand the weight of the machine, which may be as much as 3000 pounds with fixtures.

LIFTING MACHINE (Figure M7A)

The machine may be lifted by a crane with a rope or cable sling around two 1" steel bars through the bed as indicated in Figure M7A. Before lifting the machine be certain to move the saddle to its extreme inner position so it clears the lifting rope to prevent possible damage to machine. The slings should be long enough so that crane lifting hook is approximately 5 feet above table. DO NOT attempt to lift this machine by a rope sling around the saddle, or wheelhead spindle.

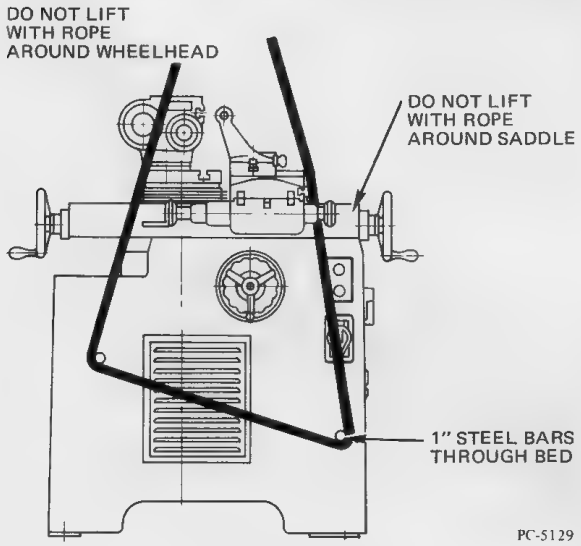

Figure M7A
LIFTING DIAGRAM

LEVELING MACHINE (Figure M7B)

For leveling machine tools a sensitive, graduated tube spirit level reading to 10 seconds per graduation (.0005" per foot) is required. A carpenter's level or the bulb in a machinist's combination square is not accurate enough. Table must be clean and free of burrs. Place 6" square pieces of shim stock under bearing pads, illustrated in Figure M7B, until machine is level in all directions. Check and adjust machine level periodically.

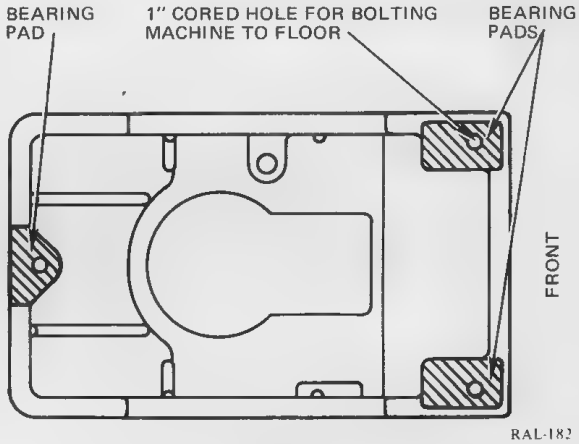

Figure M7B
AREA ON UNDERSIDE OF BASE
IN CONTACT WITH FLOOR

CLEANING

The machine should never be cleaned with the blast from an air hose as it will drive grit and dirt into ways and bearings. Use only lint-free rags for plain surfaces and a stiff bristle brush for corners. Prevent formation of permanent stain by periodic cleaning. If machine will remain idle for a long time, wipe a thin coat of oil over all exposed parts to prevent rust. It is good preventive maintenance to remove the table slide to clean balls and ways periodically. Also remove the saddle occasionally – clean the ways and re-oil. Regardless of guards, the

grinding grit in the air around a machine that is dry grinding will settle in the oil film and form a lapping compound to hasten wear. DO NOT oil or grease the balls under table. Dusting them lightly with colloidal graphite will lubricate the balls in retainer – if lubrication seems advisable.

LUBRICATION

Thoroughly lubricate all moving parts as they are installed. Then add lubricant at points indicated below before starting machine.

Purchase lubricants from reliable dealers. Use lubricant of correct specifications. Do not over-oil. The following schedule is based on a regular eight-hour day.

WHEN TO OIL	STATION NO.	PARTS LUBRICATED	INSTRUCTIONS	LUBRICANT SPECIFICATIONS*
Daily (8 hours)	1 and 2	Column Sleeve and Gears in Base	Fill spring capped oilers (2).	CMMCo. P-47
	3	Workhead – Front and Rear Spindle Bearings	Apply a few drops of oil at oil button – when used.	CMMCo. P-54
	4	Workhead Pulley – Dead Center Operation	Apply a few drops of oil at oil hole – when used.	
	5	Hand Feed Shaft Bearings, Cross Feed Nut, Table Rack and Ways and, if used, Power Feed Bushing.	Align buttons on slide and base; then pull out on plunger and allow it to return by itself. Keep reservoir filled to top of screen filter – approximately 1 quart.	CMMCo. P-47
	6	Retracting Tailstock Center Bearings	Fill spring capped oil cup.	CMMCo. P-54
Weekly (40 hours)	7	Table Drive Gearing – Power Table Traverse Machines only.	Apply 2 or 3 shots of grease at fitting.	CMMCo. P-64

*Consult the latest edition of Publication No. M-2258 for a complete list of lubricants and suppliers for the CMMCo. specifications.

NOTE: *The wheelhead spindle bearings (49A, 30A and 31A, RP4), elevating worm shaft bearings (5 and 10, RP30) and wheelhead motor bearings (12 and 20, RP4) are sealed bearings which are grease packed for the life of the bearing.*

NOTE: *The table slide rides on precision ball bearings. These and the ways should be cleaned and dried occasionally, but should never be oiled or greased, as oily lubricants will eventually pick up grinding grit. After cleaning, dust the balls lightly with colloidal graphite.*

NOTE: *Coolant tank capacity: 8 gallons (30 liters).*

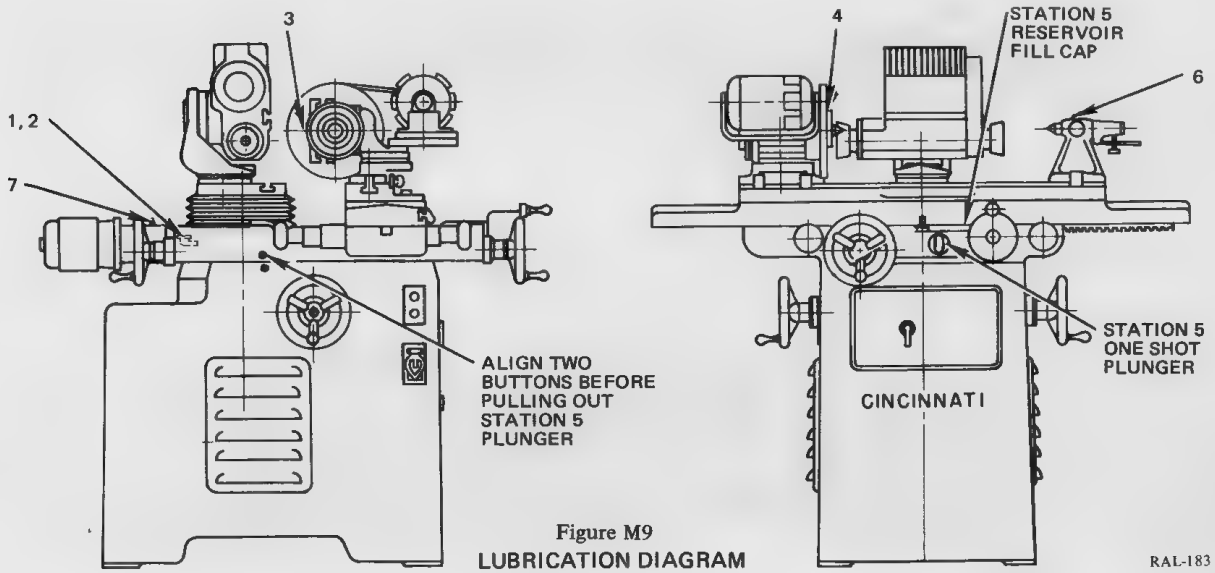

Figure M9
LUBRICATION DIAGRAM

ATTACHMENT LUBRICATION

ATTACHMENT	INSTRUCTIONS	LUBRICANT SPECIFICATIONS
Face Mill Grinding Attachment	Apply several drops of oil, daily when in use, to each of 2 oilers to lubricate the spindle bearings.	CMMCo. P-47
Work Blade Grinding Attachment	Fill 2 oil cups, daily when in use, to lubricate the blade holder bushings.	
Micrometer Table Positioning Attachment	Fill 2 oil cups, daily when in use, to lubricate the lead screw and nut.	
No. 2 Radius Grinding Attachment	Fill 1 oil cup, daily when in use, to lubricate the swivel bearings.	
No. 1 Radius Grinding Attachment	Apply several drops of oil, daily when in use, to one oil button to lubricate the spindle bearings.	
	Swivel bearings are packed at assembly and require no further lubrication, unless disassembled.	CMMCo. P-64
Internal Grinding Attachment	The spindle bearings are permanently sealed and lubricated and require no further lubrication for the life of the bearing.	None

ADJUSTMENTS

WHEELHEAD DRIVING BELTS

The motor and spindle are supplied with two step pulleys for varying the spindle speed to suit the needs of a 3½" or 6" diameter grinding wheel. The 6" diameter wheel is driven by the large spindle pulley (3890 rpm) while the 3½" wheel is driven by the small spindle pulley at 6530 rpm. Thus, both wheels grind with a surface speed of approximately 6000 sfpm.

WARNING

Machines that are to be operated with 8" grinding wheels require special driver and driven pulleys and wheel collet. See page RP8 for correct driver and driven pulley combinations.

All grinding wheels have certain safe peripheral speeds that should not be exceeded. The following table gives maximum peripheral speeds approved by the American National Standards Institute for certain standard wheels.

To figure the peripheral speed of a grinding wheel use the formula:

$$\text{Surface speed of wheel (ft./min.)} = \text{spindle rpm} \times \frac{3.1416 \times \text{wheel diameter in inches.}}{12}$$

WARNING

Do not exceed the speed printed on the wheel by the manufacturer if it is lower than that shown in the table.

Always replace belt guard after changing wheel speeds.

AMERICAN NATIONAL STANDARDS INSTITUTE, INC.
MAXIMUM PERIPHERAL SPEEDS FOR GRINDING WHEELS

Classification Number	Types of Wheels	Vitrified and Silicate Bonds			Organic Bonds		
		Low Strength SFPM	Medium Strength SFPM	High Strength SFPM	Low Strength SFPM	Medium Strength SFPM	High Strength SFPM
1	Type 1 – Straight Wheels Type 12 – Dish Wheels Type 13 – Saucer Wheels	5,500	6,000	6,500	6,500	8,000	9,500
2	Types 5 and 7 – Recessed Wheels	5,500	6,000	6,500	6,500	8,000	9,500
3	Type 11 – Flaring Cups	4,500	5,500	6,000	6,000	8,000	9,500
4	Type 6 – Deep Recessed Cup Wheels	4,500	5,000	5,500	6,000	7,500	9,000

POWER TABLE TRAVERSE

The power feed mechanism operates through a selenium rectifier that supplies power to the dc motor drive. The delivered voltage is varied by a powerstat unit to produce infinitely variable feeds to table within a range of from 7 ipm to 90 ipm. The table traverse motor start-stop switch is located at right center of control panel on front of machine, while the powerstat control switch is mounted at the center of the plate (Figure M4).

Disengage the power traverse by swinging the table traverse disengaging lever to the rear position as shown on Figure RP16. Make the necessary job setup by using manual control, then disengage hand knobs.

WHEELHEAD SPINDLE BEARINGS

This spindle is equipped with four axially preloaded ball bearings, two at either end of spindle. If spindle bearings become worn or loose it

is to your advantage to order a rebuilt spindle from us. When it arrives, return your old spindle and you will be allowed credit for any usable parts while you get the accuracy of a guaranteed spindle.

TO ADJUST WORKHEAD SPINDLE BEARINGS (Figure M11A)

1. Loosen three screws "A" through adjusting nut.

2. Tap the adjusting nut lightly to break it loose, hold the forward end of spindle and turn nut by hand until any feeling of spindle looseness has disappeared.

3. Tighten three screws "A" to lock setting.

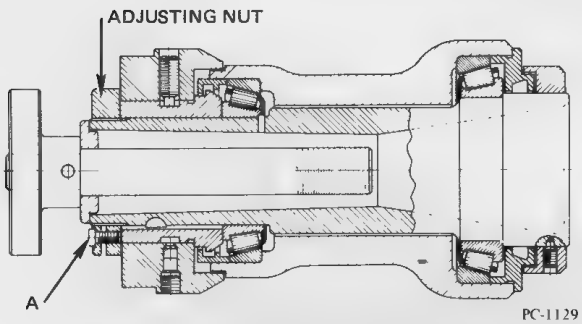

Figure M11A
SECTION THROUGH WORKHEAD

CYLINDER GRINDING ATTACHMENT BELT

To adjust the tension on V-belt (23, RP38), loosen screw (12) and move motor (5) away from the spindle to increase belt tension. When properly adjusted, the belt can be deflected ½" by pressing at a point midway between the two sheaves, see Figure M11B. Tighten screw (12) when the proper tension is obtained.

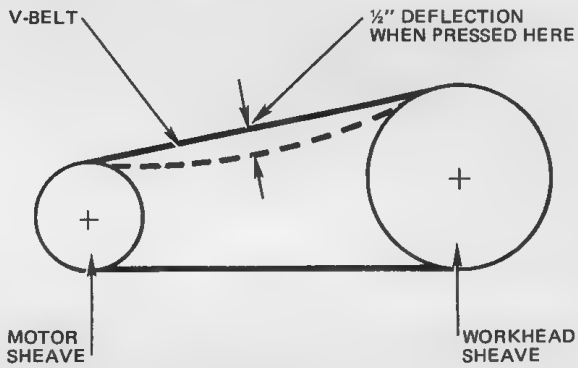

Figure M11B
V-BELT TENSION ADJUSTMENT

GRINDING WHEEL MOUNTING

GENERAL

Statistics show that over half of the wheel breakages that occur in grinding machinery are direct results of improper mounting or storage. Accidents that happen days or even weeks after the wheel has been in use can often be traced directly to some error in the mounting procedure.

Most grinding machines are for single purpose work and are heavily guarded to prevent injury to operators and surrounding personnel if breakage occurs. The complete guarding of cutter grinders however, is virtually impossible because of the very nature and variety of work. It is strongly recommended that the user build special guards to cover as much as possible his own class of work. These guards should be designed to protect not only the operator but those in the vicinity who might be affected in the event of an accident. Properly designed and placed heavy sheet metal or wire mesh screens are excellent protection for surrounding personnel.

CHECK WHEEL SPEED

Before mounting the wheel, check the maximum speed marked on the wheel. This marking appears on the side of the wheel, or on the blotter attached to the wheel. This marking indicates the maximum safe speed, in rpm, that the grinding wheel may operate.

WARNING

Never run a grinding wheel faster than the maximum safe operating speed marked on the wheel.

BEFORE MOUNTING THE GRINDING WHEEL

The following requirements must be met before mounting the grinding wheel on the collet.

1. **Test or Inspect for Cracks** – All vitrified grinding wheels must be "ring tested" before they are mounted. The wheels must be dry and free of packing material when performing the test. Suspend the wheel from the mounting hole and tap the wheel gently with a non-metallic implement. An undamaged wheel will give a clear ring when tapped. A cracked wheel will sound dead. This test is not valid for resin bond wheels as they do not emit a clear tone in either case. Resin wheels should be visually inspected for damage each time they are mounted.

2. **Inspect Mounting Parts for Flatness** – Check collet clamping nut, keyed washer, spacers, and wheel bearing surface of the collet (Figure M12) for flatness. Coat bearing surfaces of spacers, keyed washer, and collet nut with red lead or prussian blue. Rub bearing surfaces on a surface plate to determine the location of any high spots. High spots should be evenly distributed over the surface being checked. Nicks or burrs should be carefully removed so as not to remove metal below the original machined surface. Spacers and washers should also be checked on a surface plate with a dial indicator, to be certain that both sides are parallel. Coat the wheel bearing area of the collet with a thin film of red lead or prussian blue. Use a flat, precision ground ring with a 1¼" hole to check flatness of the bearing surface. Wheel bearing area must be flat and free of nicks and burrs.

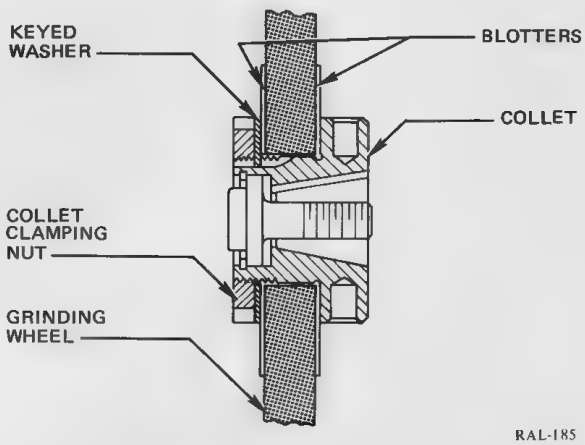

Figure M12
GRINDING WHEEL COLLET ASSEMBLY

3. **Inspect Collet – Spindle Mating Surfaces** – The tapered hole in he collet and tapered end of the spindle must fit properly when checked with red lead or prussian blue. Spindle keys must fit snugly, but not tight enough to swell the sides of the keyway.

COLLETS

> **WARNING**
>
> **Be sure that the collet parts, clamping the grinding wheel, have the same outside diameter and bearing area. Clamping surfaces of different diameters will set up dangerous stresses within the wheel which can cause wheel failure.**

When mounting the wheel, be sure that the proper sized collet is used. The following table shows the minimum collet diameter to be used with 6, 7 or 8 inch diameter wheels.

WHEEL DIAMETER	MINIMUM COLLET DIAMETER
6"	2"
7"	2½"
8"	3"

BLOTTERS

Blotters should always be used with all wheels and should be no thicker than 0.025". Never use more than one blotter per side. Where blotters are supplied loose with wheels they should not be re-used. Where the blotters are supplied glued to the wheels they must be carefully inspected for abrasions and scuffing that might result in unequal clamping pressures on the wheel. Any high spots should be carefully removed (see paragraph on Keyed Washers).

WHEEL MOUNTING HOLES

The tensile stress from rotation reaches a maximum value at the hole of the wheel, and from a safety standpoint nothing should be done to increase this stress beyond its normal value, such as forcing or cocking the wheel on the collet. If the fit is tight do not use the wheel or attempt to "open up" the hole.

KEYED WASHERS

When mounting grinding wheels on collets of 6" maximum capacity (2" flange O.D.), the keyed washer, supplied with the collet, should always be used adjacent to the nut and, whenever possible, should be placed next to the blotter of the wheel (see Figure M13). The washer between nut and wheel prevents scuffing of the blotter when the nut is tightened, and also helps to insure that the clamping nut will not "back off" regardless of the wheel rotation.

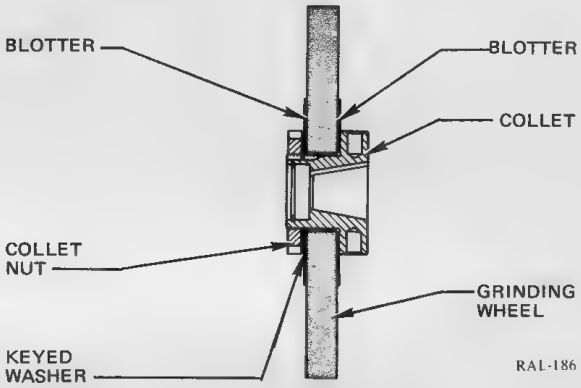

Figure M13
KEYED WASHER LOCATION

NOTE: *The keyed washer supplied with older machines was thinner than the present washer and had a tang or key bent 90° from the face of the washer. This tang prevents the key from rotating through the thread and should always be mounted away from the wheel. If this procedure is not followed, an accident may result from the tang being forced up the radius of the keyway into the bore of the wheel (see Figure M14A).*

When mounting grinding wheels on collets of 8" maximum capacity (3" flange O.D.), use a keyed washer that is relieved on both sides resulting in a bearing area equal to the bearing area of the collet. If the keyed washer is not relieved on both sides, a relieved spacer – having the bearing area equal to the bearing area of the collet – must be used against the blotter of the wheel; then, the keyed

washer against the spacer with the blotter on the other side of the wheel against the flange of the collet (see Figures M14B and M14C). It is always preferable to have one of the blotters against the flange of the collet.

Always be sure that the distance between the flange and keyed washer is sufficient to prevent the tang from bottoming in keyway slot. Sometimes spacers are required to accomplish this. If so, read the instructions under SPACERS.

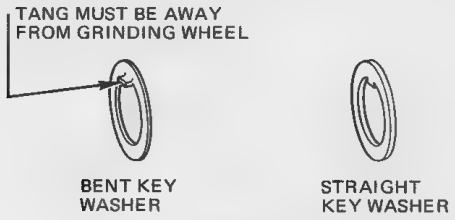

Figure M14A
KEY WASHERS

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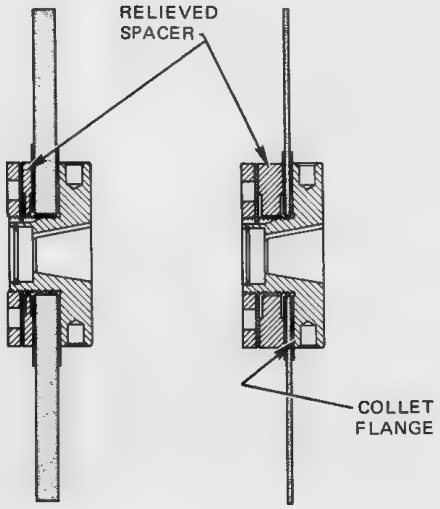


RAL-188

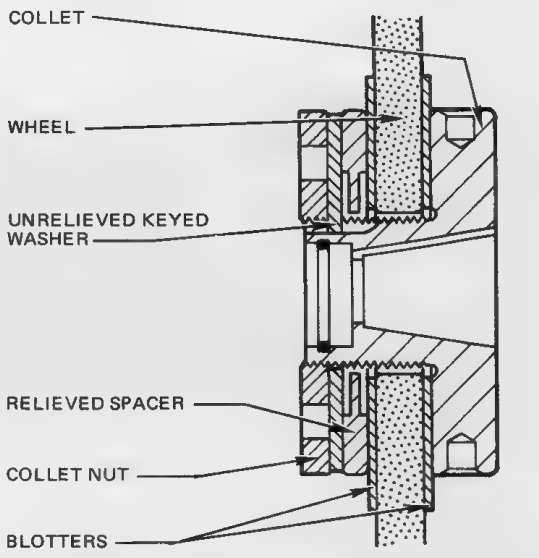
Figure M14B
WHEEL ASSEMBLIES

SPACERS

Spacers are often used to position the grinding wheel on the collet. In using spacers remember that either (a) one of the blotters of the wheel must be in contact with the flange side of the collet, as shown in Figure M15A, or (b) one of the blotters of the wheel must be in contact with a keyed washer, as shown in Figure M15B. Plain spacers (without a tang or key drive) must never be used on each side of the grinding wheel simultaneously as there would be no positive drive and the wheel may slip under heavy cuts. A spacer between the solid flange of the collet and grinding wheel is not recommended; although in rare cases it may be necessary. In these rare cases, the friction between collet flange and spacer is low and the wheel may slip if the keyed washer is not against one of the blotters to drive the grinding wheel. Also, the keyed washer must be in contact with the collet nut.

NOTE: *Care must be taken to see that the key of the washer does not bottom in keyway.*

Spacers should have a bearing area against the wheel equal to the bearing area of the collet.



RAL-189

Figure M14C
RELIEVED SPACER WITH UNRELIEVED
KEYED WASHER ON 3" DIAMETER FLANGE COLLETS

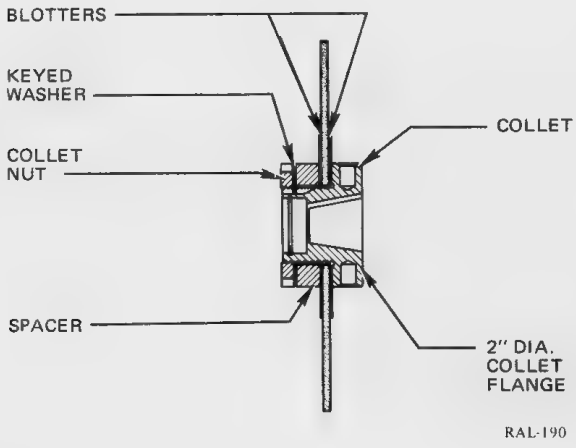


Figure M15A
WHEEL ASSEMBLY AND SPACER LOCATION

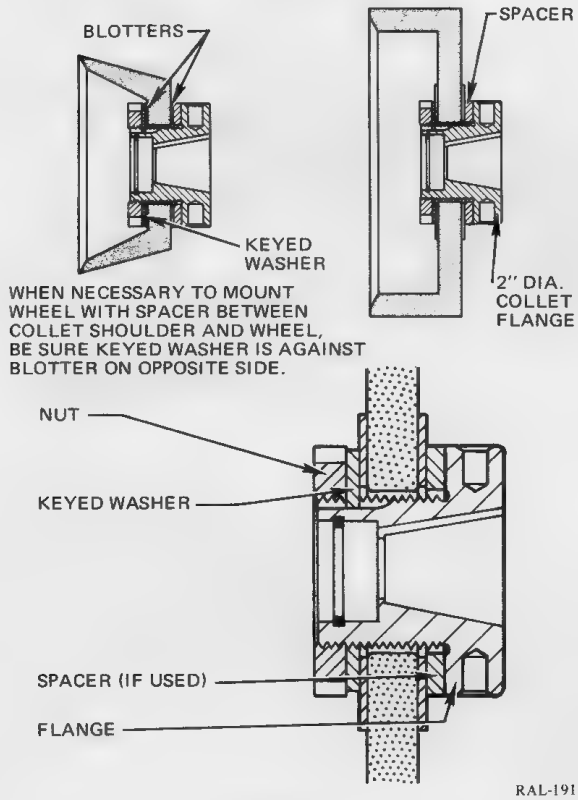


Figure M15B
WHEEL ASSEMBLY AND SPACER LOCATION

TIGHTENING THE COLLET NUT

Two holes are provided in the collet into which a collet pin wrench or pin spanner wrench must be placed to hold the collet while the collet nut is being tightened or removed. Pin diameter must never be smaller than 1/64" less than the hole. Smaller pins can cause damage to the wheel bearing surface of the collet (see Figure M15C).

Always use the special pin wrench provided for tightening and removing the collet nut. The collet nut should be seated with a firm pull. Fifteen foot pounds of torque is sufficient. This is approximately the average maximum pull by hand on a four-inch long wrench. NEVER STRIKE THE COLLET WRENCH OR COLLET NUT. If the wrench should slip and strike the wheel, the wheel must be removed and tested for cracks (see page M12).

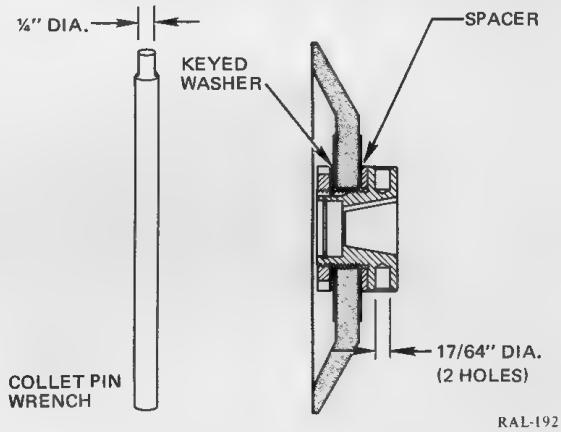


Figure M15C
TIGHTENING THE COLLET NUT

As final check, hold the collet with the pin wrench and be certain the wheel does not turn on the collet.

MOUNTING THE GRINDING WHEEL AND COLLET ASSEMBLY

Align the keyway in the tapered mounting hole in the collet with the driving key on the spindle.

There is a captive socket head screw in the center

of the collet. Start this screw into the threaded hole in the spindle with the T-wrench provided. Place a pin in one of the holes on the collet flange and hold the collet in position while tightening the socket head screw securely.

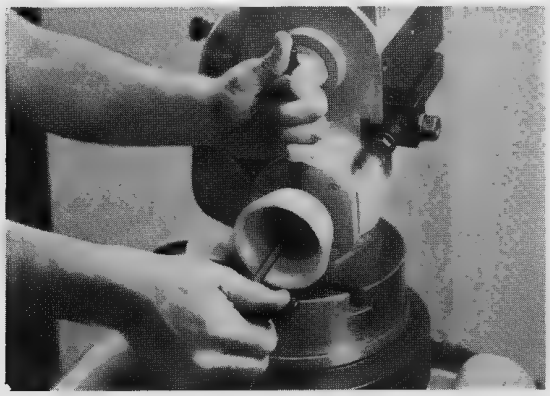


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Figure M16A
MOUNTING THE GRINDING WHEEL AND COLLET ASSEMBLY

WARNING

Never start the spindle until you are sure the spindle key is seated in the collet keyway.

STARTING THE GRINDING WHEEL SPINDLE

Do not stand in the wheel's plane of rotation. When starting the spindle, stand well to the side and warn personnel in the surrounding area. A good practice is to cover the wheel with a heavy sheet metal drum or can before it is started and allow the wheel to run for a full minute before removing the drum. In any case, allow the wheel to run for a full minute before starting to grind.

REMOVING THE COLLET

To remove the collet, back the socket head screw out with the T-wrench, while holding the collet in position with a pin or pin spanner wrench (see Figure M16B). As the screw backs out, it will unseat the collet from the spindle taper. NEVER STRIKE THE COLLET OR SPINDLE TO FREE THE TAPER. Striking the collet can also deform the wheel bearing area to a point where it is no longer flat. A grinding wheel cannot be mounted against such a deformed surface without developing dangerous stresses.

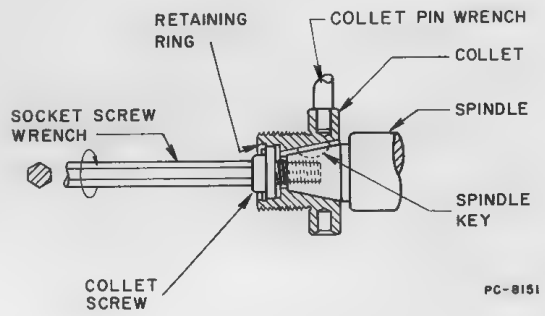


Figure M16B
REMOVING COLLET

CAUTION

NEVER PRY AGAINST THE BACK OF THE COLLET USING THE WHEELHEAD HOUSING AS A FULCRUM. This area of the wheelhead is necessarily thin and may be deformed to a point where it touches the spindle. The heat generated from friction between these surfaces can ruin the spindle bearings.

DO NOT STRIKE THE GRINDING WHEEL SPINDLE OR ANYTHING ATTACHED TO IT! EVEN A "LIGHT TAP" MAY DAMAGE THE SPINDLE BEARINGS.

HOW TO ORDER REPAIR PARTS

You will receive quicker and better service when ordering repair parts if you will adhere to the following instructions when ordering such replacements.

These four requirements are essential:

1. State amount wanted.

2. Give catalog key number, part number and name of part. If ordering parts by part number, please advise where the number was obtained.

   Number stamped on part.

   Prior Invoice.

   Parts List Catalog. (Give identification and publication number on front cover.)

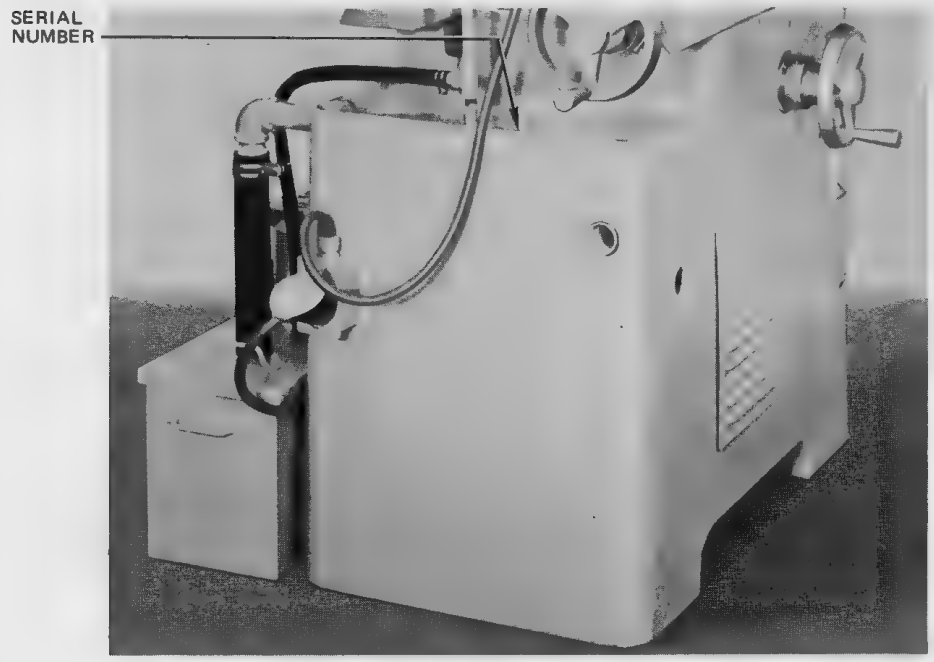
3. Give complete serial number of machine. (The number can be found stamped at top rear of base. See Figure M17).

4. Specify how and where to ship.

   Do not say, "Ship quickest way." Be definite and state agency desired, that is—Air Mail, Parcel Post (Special Delivery), Parcel Post (Regular), Express, Motor Freight, Rail Freight, etc.

   Specify each individual piece that is required in the order. If only certain parts of a unit are required, never use the word "complete"; it always raises a question as to how much of a unit to supply.

   However, in some cases, due to the nature of the part, it will be necessary and less costly to you for us to supply additional related pieces, especially if part wanted is obsolete.



10256-1

Figure M17
MACHINE SERIAL NUMBER

KEY NUMBER INDEX

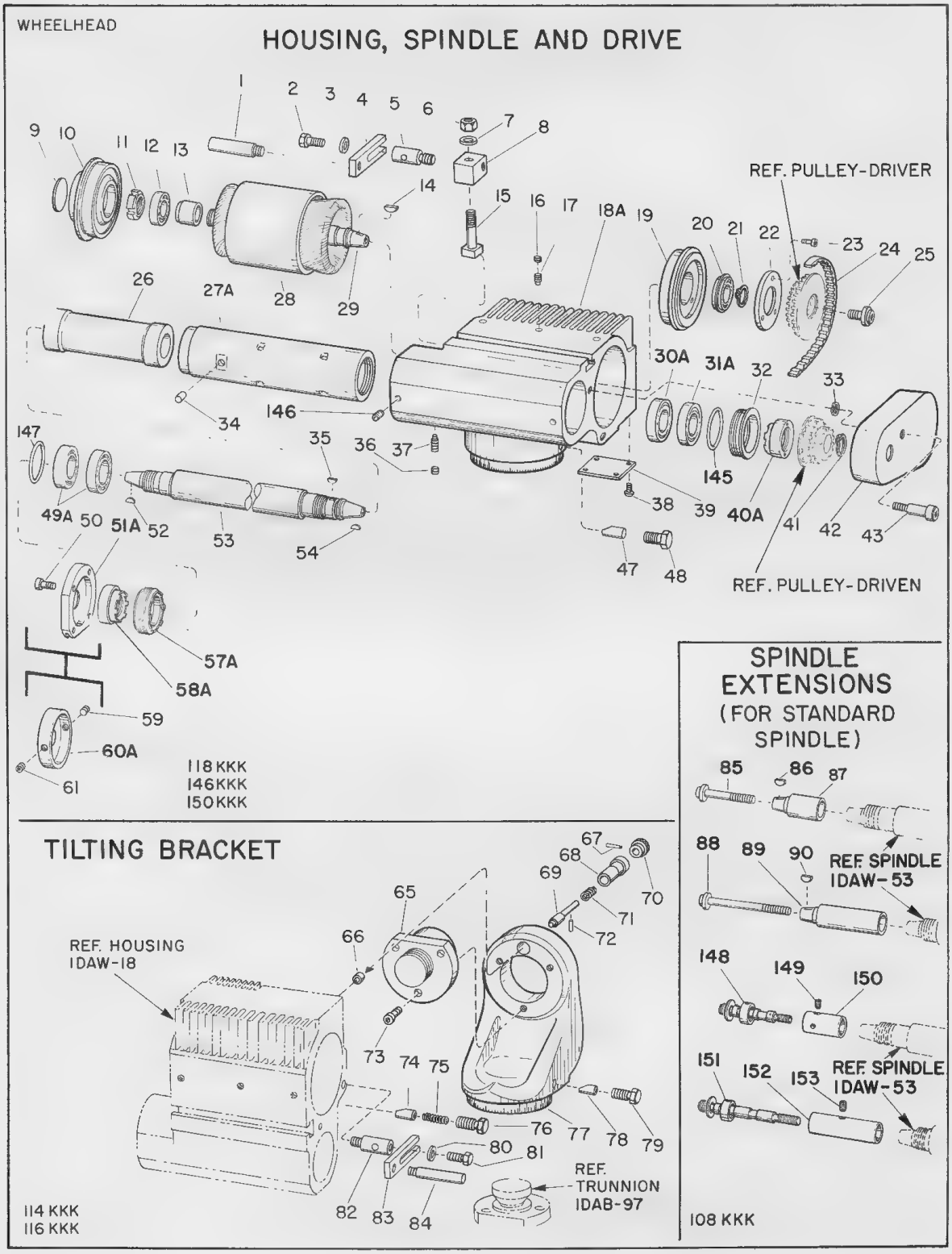
UNIT NAME	DRAWING NAME	KEY NO.	PAGE NO.	KEY NUMBERS OF OTHER UNITS
WHEELHEAD (UNIT 1DAW)	Housing, Spindle and Drive Tilting Bracket	1-43, 47-54 57-61,65-90, 145-153	RP-5	
	Wheels, Collets, and Guards	91-137	RP-9	
SADDLE TABLE (UNIT 1DH)	Slide and Swivel Tables (16" Table Travel)	12-51, 615, 662	RP-11	1DP-61 - 66
	Slide and Swivel Tables (24" Table Travel - with or without Power Feed)	103-144 663, 700, 701	RP-13	1DP-96 - 101
	Saddle (16" Table Travel)	269-274, 280, 285, 286, 295, 307, 308, 312-337 664	RP-15	1 DP-67-73
	Saddle, Power Feed (24" Table Travel)	409, 412, 419-425, 428,431 435-451, 455-464 666-688	RP-17	
	Ball Track, Table Hand Feed, Splash Guard (24" Table Travel)	465-470 479, 484, 485, 504 508-519 544-555 665	RP-19	1DP-74 - 80
	Cross Feed, Slow Table Handfeed (16" and 24" Table Travel)	556, 560-595 600-609 689-694	RP-23	
	Saddle Table Lubrication	620-631, 637, 638 641-647 653-655 696	RP-23	
	Tailstock - Diamond Bracket	192-232, 614	RP-25	
	Blade Support	233-268	RP-27	

KEY NUMBER INDEX (Continued)

UNIT NAME	DRAWING NAME	KEY NO.	PAGE NO.	KEY NUMBERS OF OTHER UNITS
WORKHEAD (UNIT 1GC)	Workhead Spindle, Draw-In Bolt	145-171, 174-189, 695	RP-29	
BASE (UNIT 1DAB)	Base and Elevating Shaft	1-33, 38-40, 47	RP-31	1DN-42,45,52-54, 1DNN-34-36, 49-51, 56-58 1DM-41, 43, 44
	Column Housing and Sleeve	60-102	RP-33	
COOLANT PUMP & PIPING (UNIT 1DP)	Coolant Pump and Piping	1-19, 23-35, 40-44 55-58 60-62	RP-35	
WORK BLADE GRINDING ATTACHMENT (UNIT 1DBW)	Work Blade Grinding Attachment	1-5 7-22	RP-37	
MICROMETER TABLE POSITIONING ATTACH. (UNIT 1DJF)	Micrometer Table Positioning Attachment	1-25	RP-37	
CYLINDRICAL GRINDING ATTACHMENT (UNIT 1DBT)	Cylindrical Grinding Attachment	1-4, 6-32	RP-39	1DM-5
DRAW-IN BOLT FOR COLLETS (UNIT 1DJF)	Draw-In Bolt, 50-40 N.S.	35-38	RP-39	
HEAVY DUTY TAILSTOCK ATTACHMENT (UNIT 1DJF)	Heavy Duty Tailstock	39-79	RP-41	
EXHAUST DUST ATTACHMENT (UNIT 1DJF)	Dust Exhaust	193	RP-41	
MISCELLANEOUS ATTACHMENTS (UNIT 1DJF)	Cutter Sharpening Arbor	149-152	RP-43	
	Saw Sharpening and Side Mill	153-158	RP-43	
	Draw-In Collet Attachment	159-165	RP-43 RP-45	
	Slot Indexing Attachment	166-180	RP-47	
	2" Raising Block	185-190	RP-47	
	Reducing Collet	191	RP-47	
	Face Mill Adapter	192	RP-47	

KEY NUMBER INDEX (Concluded)

UNIT NAME	DRAWING NAME	KEY NO.	PAGE NO.	KEY NUMBERS OF OTHER UNITS
GEAR CUTTER SHARPENING ATTACH. (UNIT 1DBV)	Gear Cutter Sharpening Attachment	1-39	RP-49	
INTERNAL GRINDING ATTACHMENT (UNIT 1DBP)	Internal Grinding Attachment	1-48	RP-51	
RADIUS GRINDING ATTACHMENT NO. 1 (UNIT 1DGB)	No. 1 Radius Grinding Attachment	1-77	RP-53	
	No. 1 Radius Grinding Attachment	78-141 145-148	RP-55	
RADIUS GRINDING ATTACHMENT NO. 2 (UNIT 1DEJ)	No. 2 Radius Grinding Attachment	1-85	RP-57	
FACE MILL GRINDING ATTACHMENT (UNIT 1DCA)	Face Mill Grinding Attachment	7-46 51-55	RP-59	1DAW-138 - 144 1DJF-197, 198
SURFACE GRINDING ATTACHMENT (UNIT 1DBU)	Surface Grinding Attachment	1-30	RP-61	
LONG REAMER GRINDING ATTACHMENT (UNIT 1DBZ)	Long Reamer Grinding Attachment	1-56	RP-63	
	Instruction Plates	1-8	RP-65	


WHEELHEAD
HOUSING, SPINDLE AND DRIVE
REF. PULLEY-DRIVER
REF. PULLEY-DRIVEN
118 KKK
146 KKK
150 KKK
TILTING BRACKET
REF. HOUSING
IDAW-18
REF.
TRUNNION
IDAB-97
114 KKK
116 KKK
SPINDLE
EXTENSIONS
(FOR STANDARD
SPINDLE)
REF. SPINDLE
IDAW-53
REF. SPINDLE
IDAW-53
108 KKK

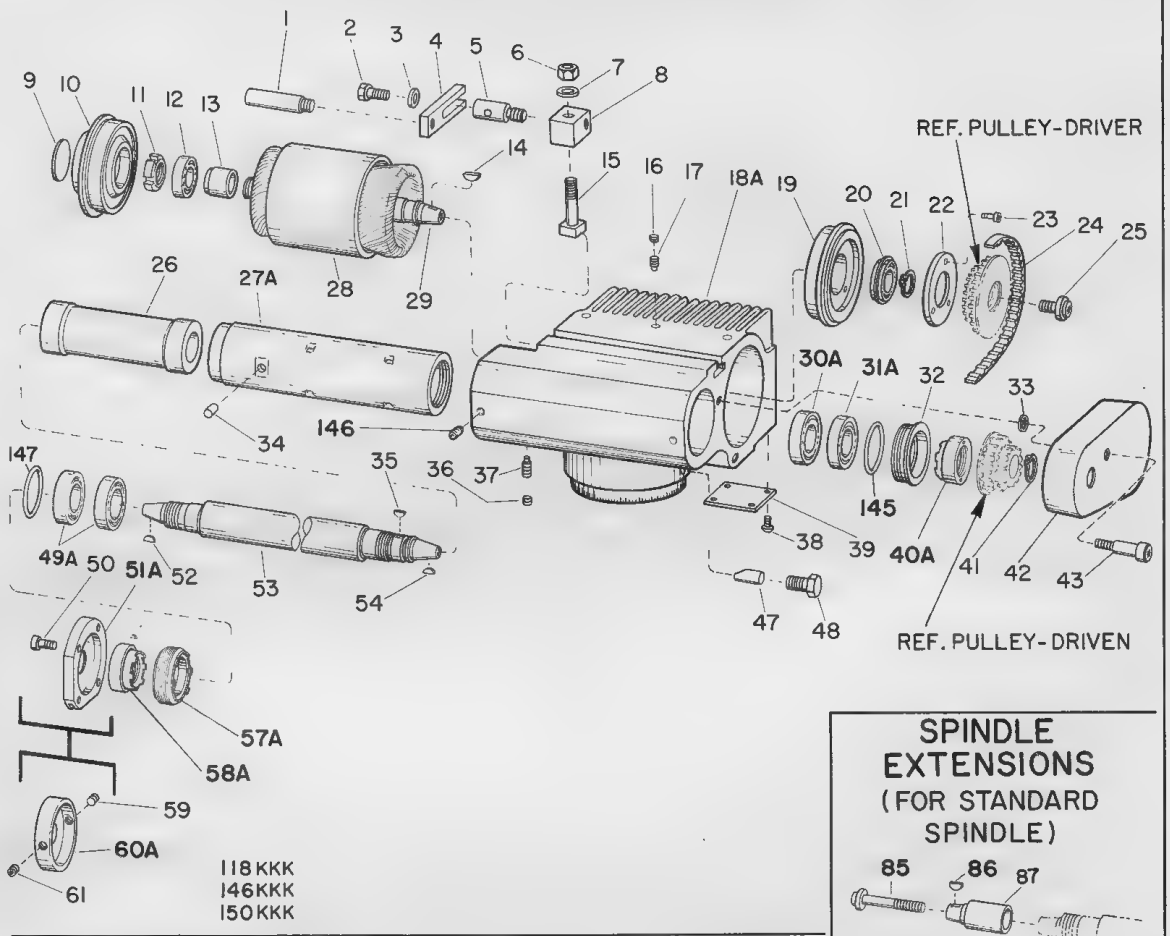
WHEELHEAD – UNIT 1 DAW

KEY NO.	PART NO.	PART NAME	AMT. USED
1DAW-1		Stud - Wheel Guard	
	189640	For Pulley End Wheel Guard	1
	189640	For Front End Wheel Guard, Standard Spindle	1
	189641	For Front End Wheel Guard, 2" Extended Spindle	1
	189642	For Front End Wheel Guard, 4" Extended Spindle	1
1DAW-2	49	Screw - Hex Head	2
1DAW-3	3441	Washer	2
1DAW-4	189638	Arm - Wheel Guard	2
1DAW-5	189637	Stud - Extension	2
1DAW-6	3479	Nut - Hex (Without Tilting Bracket)	2
1DAW-7	3442	Washer (Without Tilting Bracket)	2
1DAW-8	189639	Block - Guard Mounting (Without Tilting Bracket)	2
1DAW-9	69490	Plug	1
1DAW-10	173324	Bell - End, Front	1
1DAW-11	606854	Nut - Lock	1
1DAW-12	191667	Bearing - Ball	1
1DAW-13	173321	Spacer	1
1DAW-14	3279	Key - Hi-Pro	1
1DAW-15	3274	Bolt - Tee (Without Tilting Bracket)	2
1DAW-16	2355	Screw - Set	3
1DAW-17	279665	Screw - Set	3
1DAW-18A	309559	Housing - Wheelhead	1
1DAW-19	173334	Bell - End, Rear	1
1DAW-20	191651	Bearing - Ball	1
1DAW-21	137926	Ring - Retaining	1
1DAW-22	173322	Retainer	1
1DAW-23	3194	Screw - Cap	3
1DAW-24	143633	Belt - Timing	1
1DAW-25	143627	Screw	1
1DAW-26		Spacer - Bearing	
	171377	Standard Spindle	1
	172746	4" Extended Spindle	1
1DAW-27A		Sleeve - Bearing	
	309566	Standard Spindle	1
	309565	4" Extended Spindle	1
1DAW-28	Example	*Motor	1
1DAW-29	173323	Shaft - Motor	1
1DAW-30A	305604	Bearing - Ball	1
1DAW-31A	305604	Bearing - Ball	1
1DAW-32	171393	Nut - Retainer	1
1DAW-33	184617	Ring - Retaining	1
1DAW-34	171383	Pin	1
1DAW-35	3280	Key - Hi-Pro	1
1DAW-36	2354	Screw - Set	4
1DAW-37	3230	Screw - Set	4
1DAW-38	2369	Screw - Button Head Cap	4
1DAW-39	189645	Cover - Electrical Cavity	1
1DAW-40A	309563	Nut - Retainer, Rear	1
1DAW-41	158682	Ring - Retaining	1
1DAW-42	184618	Cover - Drive	1
1DAW-43	184616	Screw	1
1DAW-47	189636	Plug- Locking (Without Tilting Bracket)	2
1DAW-48	741	Screw - Hex Head Set (Without Tilting Bracket)	2
1DAW-49A	305604	Bearing - Ball	2
1DAW-50	3396	Screw - Cap (With Standard Spindle)	4
1DAW-51A	309560	Cap (With Standard Spindle)	1
1DAW-52	3279	Key - Hi-Pro	1
1DAW-53		Spindle	
	191662	Standard	1
	191663	4" Extended	1
1DAW-54	3279	Key - Hi-Pro	1
1DAW-57A	309564	Nut - Adjusting	1
1DAW-58A	309562	Nut - Retainer, Front	1
1DAW-59	2354	Screw - Set (With 4" Extended Spindle)	1
1DAW-60A	309561	Guard - Dust (With 4" Extended Spindle)	1
1DAW-61	2354	Screw - Set (With 4" Extended Spindle)	1
1DAW-65	189635	Trunnion	1
1DAW-66	143665	Bushing	1
1DAW-67	140	Pin - Taper	1
1DAW-68	181977	Housing - Shot Pin	1
1DAW-69	181976	Plunger - Shot Pin	1
1DAW-70	126873	Knob - Knurled	1
1DAW-71	3954	Spring - Compression	1
1DAW-72	3270	Pin	1
1DAW-73	3399	Screw - Cap	3
1DAW-74	189636	Plug - Locking	2
1DAW-75	93800	Spring - Compression	2
1DAW-76	189646	Screw - Locking	2
1DAW-77	189633	Bracket - Tilting	1
1DAW-78	189636	Plug - Locking	2
1DAW-79	741	Screw - Hex Head Set	2
1DAW-80	3441	Washer	2
1DAW-81	49	Screw - Hex Head	2
1DAW-82	189637	Stud - Extension	2
1DAW-83	189638	Arm - Wheel Guard	2
1DAW-84		Stud - Wheel Guard	
	189640	For Pulley End Wheel Guard	1
	189640	For Front End Wheel Guard, Standard Spindle	1
	189641	For Front End Wheel Guard, 2" Extended Spindle	1
	189642	For Front End Wheel Guard, 4" Extended Spindle	1
1DAW-85	156171	Screw	1
1DAW-86	3279	Key - Hi-Pro	1
1DAW-87	156172	Extension - Spindle, 2"	1
1DAW-88	156174	Screw	1
1DAW-89	156173	Extension - Spindle, 4"	1
1DAW-90	3279	Key - Hi-Pro	1
1DAW-145	308832	Ring - "O"	1
1DAW-146	4236	Plug - Pipe	2
1DAW-147	308832	Ring - "O"	1
1DAW-148	158169	Screw - Extension Spindle	1
1DAW-149	3226	Screw - Set	1
1DAW-150	158170	Collar - Extension Spindle	1
1DAW-151	305887	Screw - Extension Spindle, 4"	1
1DAW-152	305886	Collar - Extension Spindle, 4"	1
1DAW-153	3226	Screw - Set	1

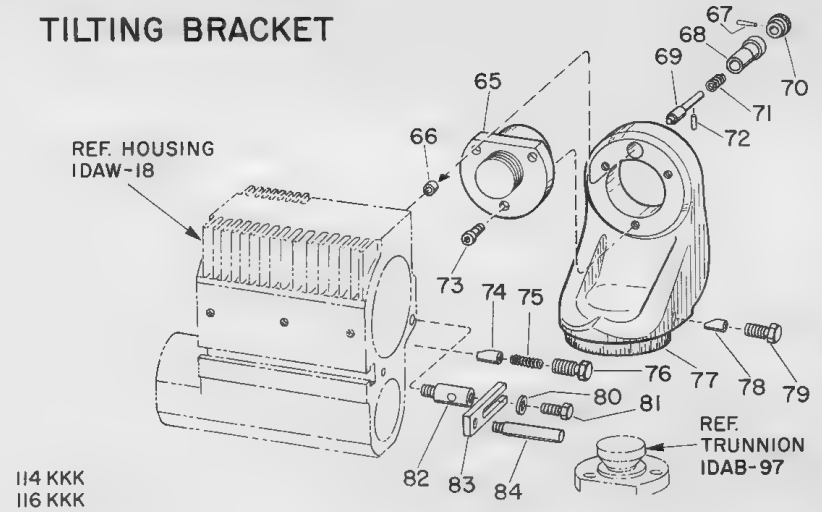
*When ordering a replacement part, specify part number (if available), part name, all part characteristic data available and the serial number of your machine.

WHEELHEAD

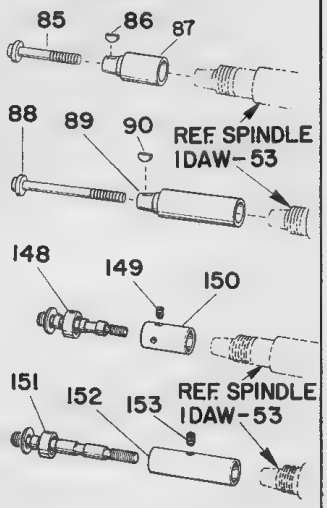
HOUSING, SPINDLE AND DRIVE



TILTING BRACKET



SPINDLE EXTENSIONS (FOR STANDARD SPINDLE)



TO REMOVE GRINDING WHEEL SPINDLE (53, RP4)

1. Remove spindle drive cover (42) and belt (24, RP4). Remove spindle lock screw (115 or 120, RP8) and collet (112 or 117) with grinding wheel, from one or both ends of spindle.

2. Remove retaining ring (41, RP4) and slip driven pulleys off spindle. On machine without 4" extended spindle, remove four screws (50) and cap (51) from front end of spindle. Remove eight screws (36 and 37) and slip bearing retainer sleeve (27) with spindle assembly out of wheelhead housing.

Ship this assembly back to our factory for credit and install a new factory guaranteed spindle. Make certain that driver and driven pulleys are in line when assembling.

TO REMOVE TILTING BRACKET (77, RP4) FROM WHEELHEAD

1. Proceed per instructions in paragraphs 1, 2, and 3, page RP33.

2. Place wheelhead on bench with knob (70, RP4) up. Remove screw (76), spring (75), and plug (74) from each side of wheelhead. Lift tilting bracket (77) with trunnion (65) and locking device (69-72) from wheelhead.

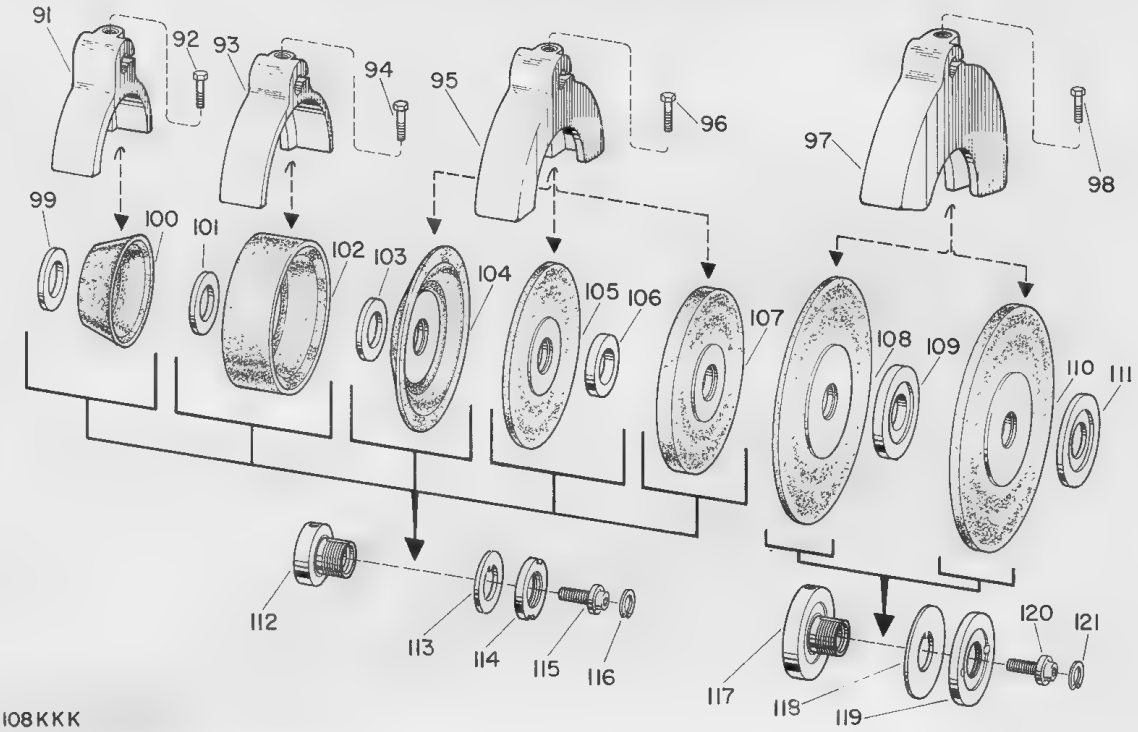
TO REMOVE WHEELHEAD MOTOR SHAFT (29, RP4)

1. Remove belt guard (42, RP4) belt and driver pulley assembly.

2. Remove screws (16, 17, RP4) on front end and remove Front End Bell (10). Push spindle (29) with armature out pulley end of housing. (Motor shaft, with all rotating parts should be dynamically balanced before installation.)

WHEELHEAD

WHEELS, COLLETS, AND GUARDS



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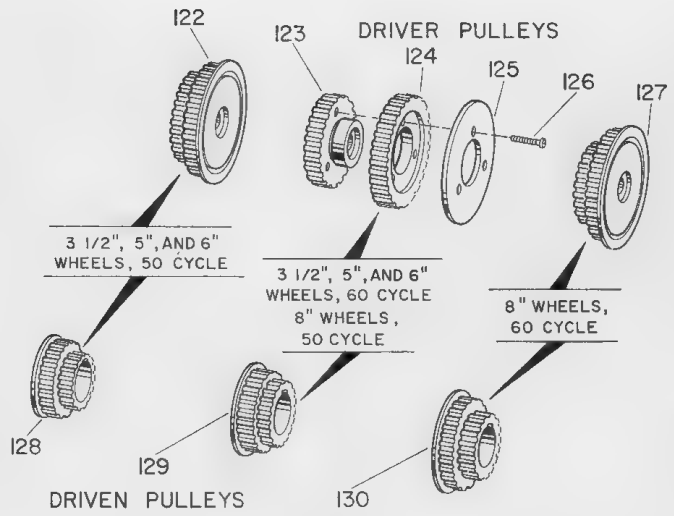
PULLEYS



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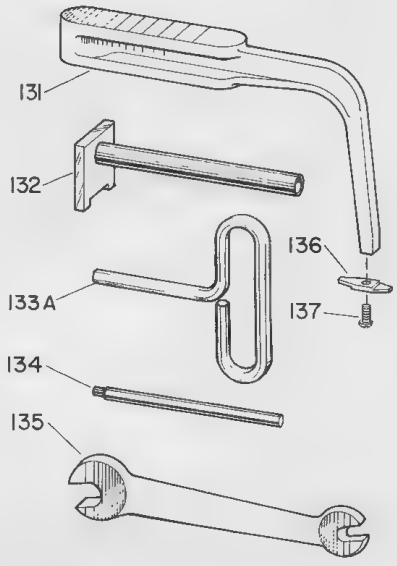
CENTERING GAGE AND WRENCHES



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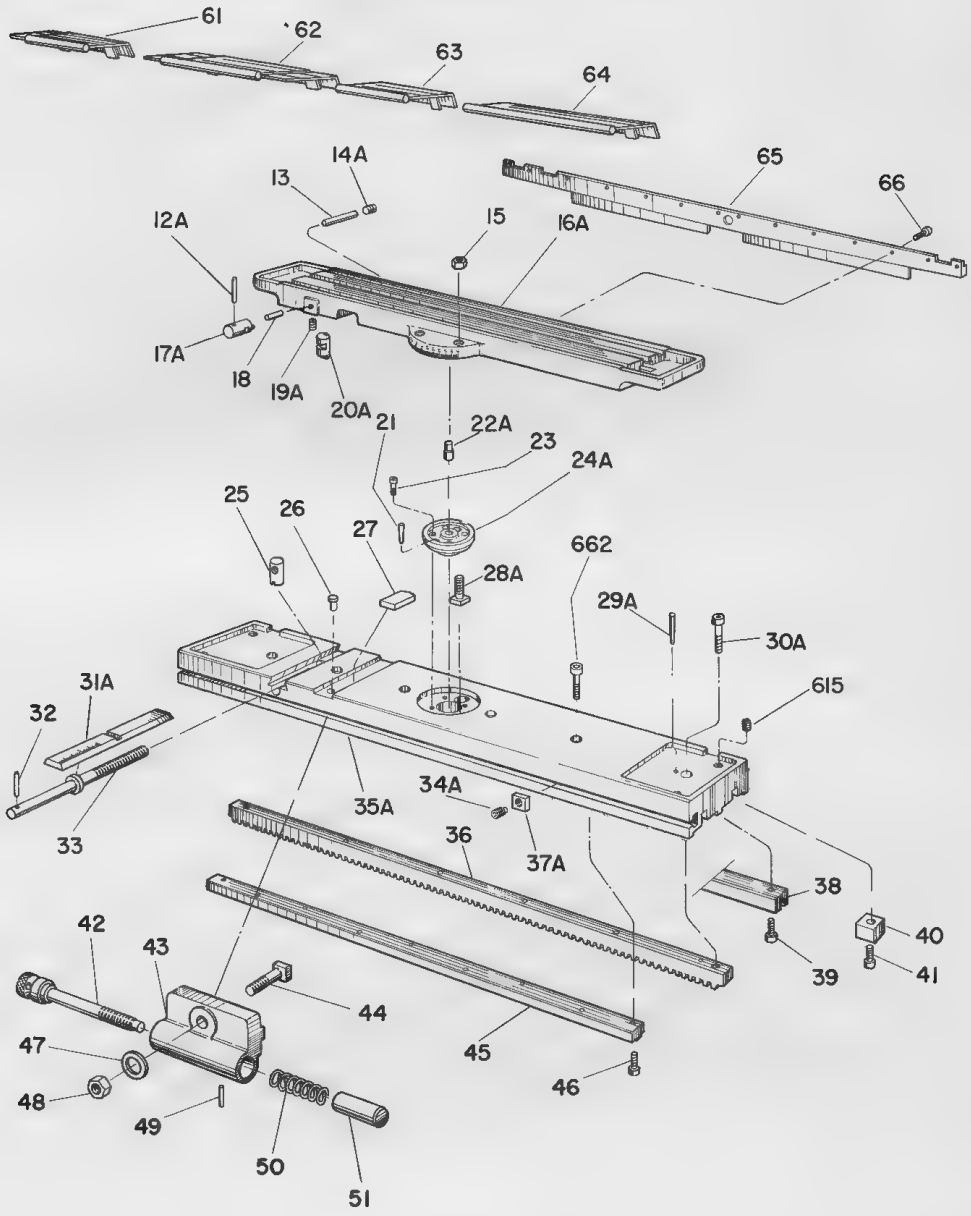
WHEELHEAD – UNIT 1 DAW (Concluded)

KEY NO.	PART NO.	PART NAME	AMT. USED
1DAW-91	69492	Guard - Wheel, Flaring Cup	1
1DAW-92	49	Screw - Hex Head	1
1DAW-93	62270	Guard - Wheel, Straight Cup	1
1DAW-94	49	Screw - Hex Head	1
1DAW-95	62269	Guard - Wheel, Disc	1
1DAW-96	49	Screw - Hex Head	1
1DAW-97	65376	Guard - Wheel, 8"	1
1DAW-98	49	Screw - Hex Head	1
1DAW-99	67784	Collar - 1/8"	1
1DAW-100	67783	Wheel - Grinding, 3-1/2" x 1-1/2" x 1-1/4" Flaring Cup	1
1DAW-101	67784	Collar - 1/8"	1
1DAW-102	62277	Wheel - Grinding, 5" x 1-1/2" x 1-1/4" Straight Cup	1
1DAW-103	67784	Collar - 1/8"	1
1DAW-104	60481	Wheel - Grinding, 6" x 3/4" x 1-1/4" Dished	1
1DAW-105	67782	Wheel - Grinding, 6" x 1/8" x 1-1/4" Straight	1
1DAW-106	67785	Collar - 3/8"	1
1DAW-107	60479	Wheel - Grinding, 6" x 1/2" x 1-1/4" Straight	1
1DAW-108	74012	Wheel - Grinding, 8" x 1/16" x 1-1/4" Straight Side	1
1DAW-109	157755	Collar - 5/8"	1
1DAW-110	65613	Wheel - Grinding, 8" x 3/8" x 1-1/4" Straight Side	1
1DAW-111	157754	Collar - 1/8"	1
1DAW-112	188706	Collet - Grinding Wheel	5
1DAW-113	188828	Washer - Keyed	5
1DAW-114	67789	Nut - Collet	5
1DAW-115	143627	Screw	5
1DAW-116	188711	Ring - Retaining	5
1DAW-117	188705	Collet - Grinding Wheel	1
1DAW-118	188829	Washer - Keyed	1
1DAW-119	157756	Nut - Collet	1
1DAW-120	143627	Screw	1
1DAW-121	188711	Ring - Retaining	1
1DAW-122	161813	Pulley - Driver	1
1DAW-123	143630	Pulley - Driver, Low Speed	1
1DAW-124	143631	Pulley - Driver, High Speed	1
1DAW-125	143736	Flange - Driver Pulley	1
1DAW-126	3200	Screw - Cap	3
1DAW-127	165204	Pulley - Driver	1
1DAW-128	191664	Pulley - Driven	1
1DAW-129	191665	Pulley - Driven	1
1DAW-130	191666	Pulley - Driven	1
1DAW-131	154408	Bracket - Centering Gage	1
1DAW-132	157757	Wrench - Collet Nut	1
1DAW-133A	309442	Wrench - Tee	1
1DAW-134	62281	Wrench - Pin	1
1DAW-135	19476	Wrench - Open End	1
1DAW-136	65815	Plate - Centering Gage	1
1DAW-137	3460	Screw	1

SADDLE TABLE

SLIDE & SWIVEL TABLES

16" TABLE TRAVEL



126KKK
127KKK

SADDLE TABLE – UNIT 1 DH

KEY NO.	PART NO.	PART NAME	AMT. USED
1DH-12A	3542	Pin	1
1DH-13	149574	Pin - Adjusting	1
1DH-14A	180270	Screw - Set	1
1DH-15	3479	Nut	2
1DH-16A	191632	Table - 16" Table Travel	1
1DH-17A	160013	Eccentric	1
1DH-18	3636	Pin	1
1DH-19A	172444	Screw	1
1DH-20A	160012	Finger	1
1DH-21	1857	Pin - Taper	1
1DH-22A	159905	Pin - Table Swivel	1
1DH-23	3482	Screw	3
1DH-24A	159910	Trunnion - Table Clamp	1
1DH-25	69912	Nut - Hand Adjusting Screw	1
1DH-26	143702	Pin - Locating	1
1DH-27		Block - Set	
	149573	3-1/2" Inch System	1
	158482	Metric	1
	143687	1" Inch System	1
	158480	Metric	1
1DH-28A	193307	Bolt - Tee	2
1DH-29A	1894	Pin	1
1DH-30A	3402	Screw	2
1DH-31A		Plate - Table Adjusting	
	160016	Inch System	1
	196477	Symbolized	1
	160018	Metric	1
	305280	Symbolized	1
1DH-32	3277	Pin	1
1DH-33	69915	Screw - Table Adjusting	1
1DH-34A	3453	Screw	2
1DH-35A	191647	Slide - Table	1
1DH-36	149570	Rack - On Table	1
1DH 37A	133887	Stop - Limit	2
1DH-38	79950	Track - Ball	8
1DH-39	3396	Screw	1
	124975	Screw (Left end only)	4
1DH-40	93159	Block - Filler	4
1DH-41	3399	Screw	2
1DH-42	67041	Screw - Thumb	
1DH-43		Dog	1
	64962	Right Hand	1
	64961	Left Hand	2
1DH-44	3328	Bolt - Tee	1
1DH-45	93135	Rail - Ball	9
1DH-46	3396	Screw	2
1DH-47	125	Washer	2
1DH-48	664	Nut	2
1DH-49	3383	Pin	2
1DH-50	1740	Spring	2
1DH-51	64963	Plunger	1
1DP-61	159949	Guard - Table, Splash, 9-3/4" Long	1
1DP-62	159950	Guard - Table, Splash, 13-1/4" Long	1
1DP-63	159948	Guard - Table, Splash, 5" Long	1
1DP-64	159951	Guard - Table, Splash, 16-3/4" Long	1
1DP-65	159918	Trough - Coolant, Slide	15
1DP-66	2368	Screw	4
1DH-615	1154	Screw	4
1DH-662	3192	Screw	1

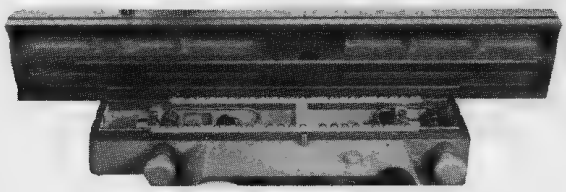


Figure RP11 3151-6-4
TABLE SLIDE AND BALL TRACK

TO REMOVE TABLE (16A, RP10)

(Instructions are referenced to 16" table. Procedure is the same for all sizes.)

1. Strip attachments from top of table. Unscrew two 1/2" swivel clamping nuts (15, RP10) from front of table.

2. Turn swivel adjustment disengaging eccentric (17A, RP10) so pin (12A) points straight up; swivel table and lift it straight up off clamping T-bolts. Table weighs over 60 lbs.

TO REMOVE TABLE SLIDE (35A, RP10)

1. Strip attachments and dogs (43, RP10) from table. Disengage table traverse knobs and slow movement crank. (Pull out hand shaft knobs 327, RP14 and 600, RP20.)

2. Push table slide to right and then to left far enough to remove safety studs (280, RP14) from both ends of saddle. (Hold up outer end of table as it is moved.) Attach table to a crane using four eye bolts in place of four screws (615). Sling rope or cable through two eye bolts and lift table slide straight up.

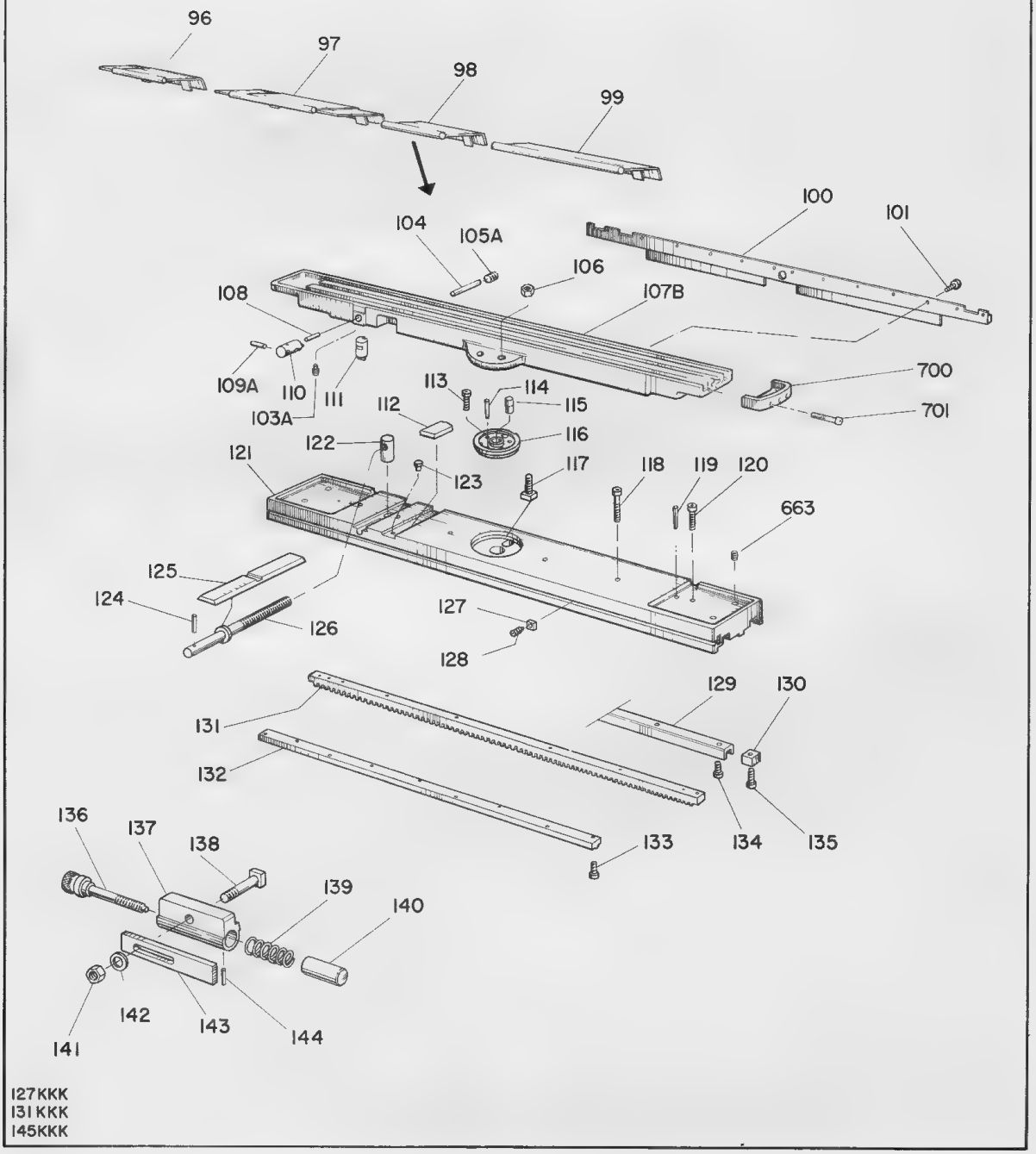
If no crane is available, it is possible to slide table slide off one side after first removing filler blocks (40, RP10) from the opposite end. When replacing, exercise extreme caution not to knock any balls out of their cage. The table slide is quite heavy – 180 lbs., by itself and 240 lbs., in combination with table.

SADDLE TABLE

SLIDE & SWIVEL TABLES

24" TABLE TRAVEL

WITH OR WITHOUT POWER FEED



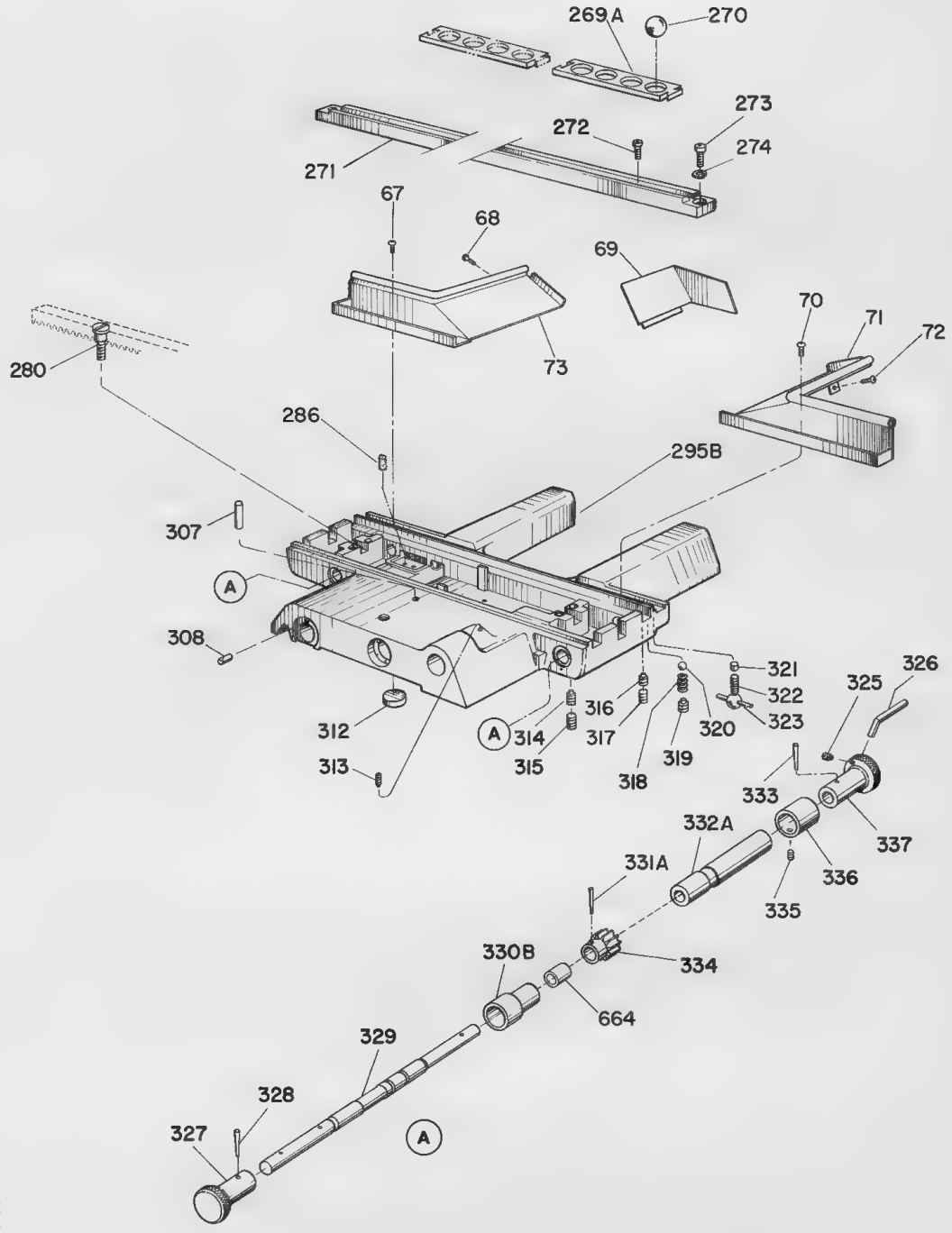
127KKK
131KKK
145KKK

SADDLE TABLE – UNIT 1 DH (Continued)

KEY NO.	PART NO.	PART NAME	AMT. USED
1DP-96	159949	Guard - Table, Splash, 9-3/4" Long	1
1DP-97	159950	Guard - Table, Splash, 13-1/4" Long	1
1DP-98	159948	Guard - Table, Splash, 5" Long	1
1DP-99	159951	Guard - Table, Splash, 16-3/4" Long	1
1DP-100	159918	Trough - Coolant, Slide	1
1DP-101	2368	Screw	15
1DH-103A	172444	Screw	1
1DH-104	149574	Pin - Adjusting	1
1DH-105A	180270	Screw	1
1DH-106	3479	Nut	2
1DH-107B	303995	Table - Swivel	1
1DH-108	3636	Pin	1
1DH-109A	3542	Pin	1
1DH-110	160013	Eccentric	1
1DH-111	160012	Finger	1
1DH-112		Block - Set, 3-1/2" x 1"	
	149573	3-1/2" Inch System	2
	158482	Metric	2
	143687	1" Inch System	2
	158480	Metric	2
1DH-113	3399	Screw	4
1DH-114	1857	Pin - Taper	1
1DH-115	159905	Pin - Table, Swivel	1
1DH-116	159910	Trunnion	1
1DH-117	126833	Bolt - Tee	2
1DH-118	3192	Screw	5
1DH-119	1894	Pin	1
1DH-120	3402	Screw	2
1DH-121	160015	Table - Slide	1
1DH-122	69912	Nut - Hand Adjusting Screw	1
1DH-123	143702	Pin - Locating	1
1DH-124	3277	Pin	1
1DH-125		Plate - Table Adjusting	
	160016	Inch System	1
	196477	Symbolized	1
	160018	Metric	1
	305280	Symbolized	1
1DH-126	69915	Screw - Table Adjusting	1
1DH-127	133887	Stop - Limit	2
1DH-128	3453	Screw	2
1DH-129	159912	Track - Ball	1
1DH-130	93159	Block - Filler	4
1DH-131	159902	Rack - On Table	1
1DH-132	159911	Rail - Ball	1
1DH-133	3396	Screw	10
1DH-134	3396	Screw	10
1DH-135	3399	Screw	4
1DH-136	67041	Screw - Thumb	2
1DH-137		Dog - Table	
	64962	Right Hand (Without Power Feed)	1
	64961	Left Hand (Without Power Feed)	1
	159907	Right Hand (With Power Feed)	1
	159906	Left Hand (With Power Feed)	1
1DH-138		Bolt - Tee	
	3328	Without Power Feed	2
	113266	With Power Feed	2
1DH-139	1740	Spring	2
1DH-140	64963	Plunger	2
1DH-141	664	Nut	2
1DH-142	125	Washer	2
1DH-143	159908	Plate - Limit Switch Trip (With Power Feed)	2
1DH-144	3383	Pin	2
1DH-663	1154	Screw	4
1DH-700	303996	Trough - Table End	1
1DH-701	3217	Screw	3

SADDLE TABLE

SADDLE
16" TABLE TRAVEL



128KKK
131KKK

SADDLE TABLE – UNIT 1 DH (Continued)

KEY NO.	PART NO.	PART NAME	AMT. USED
1DP-67	2368	Screw	1
1DP-68	2375	Screw	1
1DP-69	193390	Guard - Splash, L. H. Rear	1
1DP-70	2368	Screw	1
1DP-71	191659	Guard - Splash, R. H.	1
1DP-72	2375	Screw	1
1DP-73	191658	Guard - Splash, L. H.	1
1DH-269A	184646	Cage - Ball	10
1DH-270	68489	Ball - 3/4"	40
1DH-271	78678	Track - Ball	2
1DH-272	3396	Screw	18
1DH-273	3400	Screw	4
1DH-274	2135	Washer	4
1DH-280	140209	Stud - Safety	4
1DH-285	2209	Screw	1
1DH-286	2251	Plug	2
1DH-295B	184633	Saddle - 16" Table Travel	1
1DH-307	68205	Pin	1
1DH-308	79980	Pin - Index	2
1DH-312	3559	Plug - 3"	1
1DH-313	3233	Screw	1
1DH-314	3233	Screw	2
1DH-315	3211	Screw	2
1DH-316	1917	Screw	2
1DH-317	3232	Screw	2
1DH-318	262	Spring	2
1DH-319	3232	Screw	2
1DH-320	13665	Ball - 5/16" Diameter	2
1DH-321	1962	Plug	2
1DH-322	3536	Screw	2
1DH-323	3537	Handle	2
1DH-325	1911	Screw	2
1DH-326	67947	Lever - Shaft, Hand Feed	2
1DH-327	129716	Knob - Hand Shaft	2
1DH-328	642	Pin - Taper	2
1DH-329	126815	Shaft - Hand Feed	2
1DH-330B	191654	Bushing - Front, Hand Feed Shaft	2
1DH-331A	148097	Pin - Taper	2
1DH-332A	180233	Bushing - Rear, Hand Feed Shaft	2
1DH-333	642	Pin - Taper	2
1DH-334	107411	Pinion	2
1DH-335	3228	Screw	2
1DH-336	79962	Guard - Hand Feed Shaft Bushing	2
1DH-337	130019	Knob - Shaft	2
1DH-664	191653	Bushing - Oilite	2

TO REMOVE HAND FEED SHAFT (329, RP14)

1. Drive out taper pin (328, RP14) and remove front hand shaft knob (327).

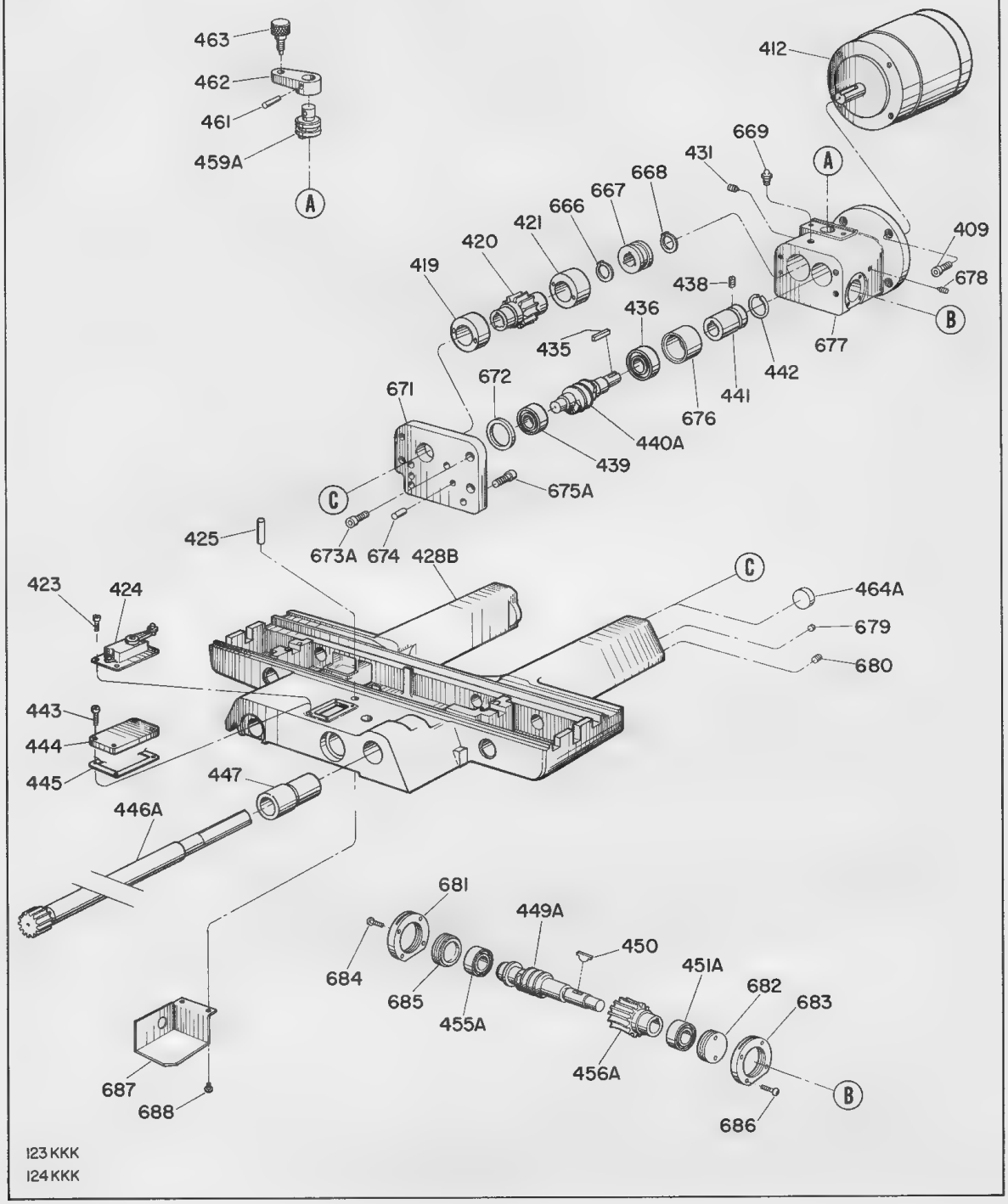
2. Push table slide to opposite side far enough to drive taper pin from pinion (334). (Block up under extended end of table.)

3. Loosen clamp (323, RP14), remove set screw (319), spring (318) and ball (320). Pull hand feed shaft out the back of saddle.

SADDLE TABLE

SADDLE, POWER FEED

24" TABLE TRAVEL



123 KKK
124 KKK

SADDLE TABLE – UNIT 1 DH (Continued)

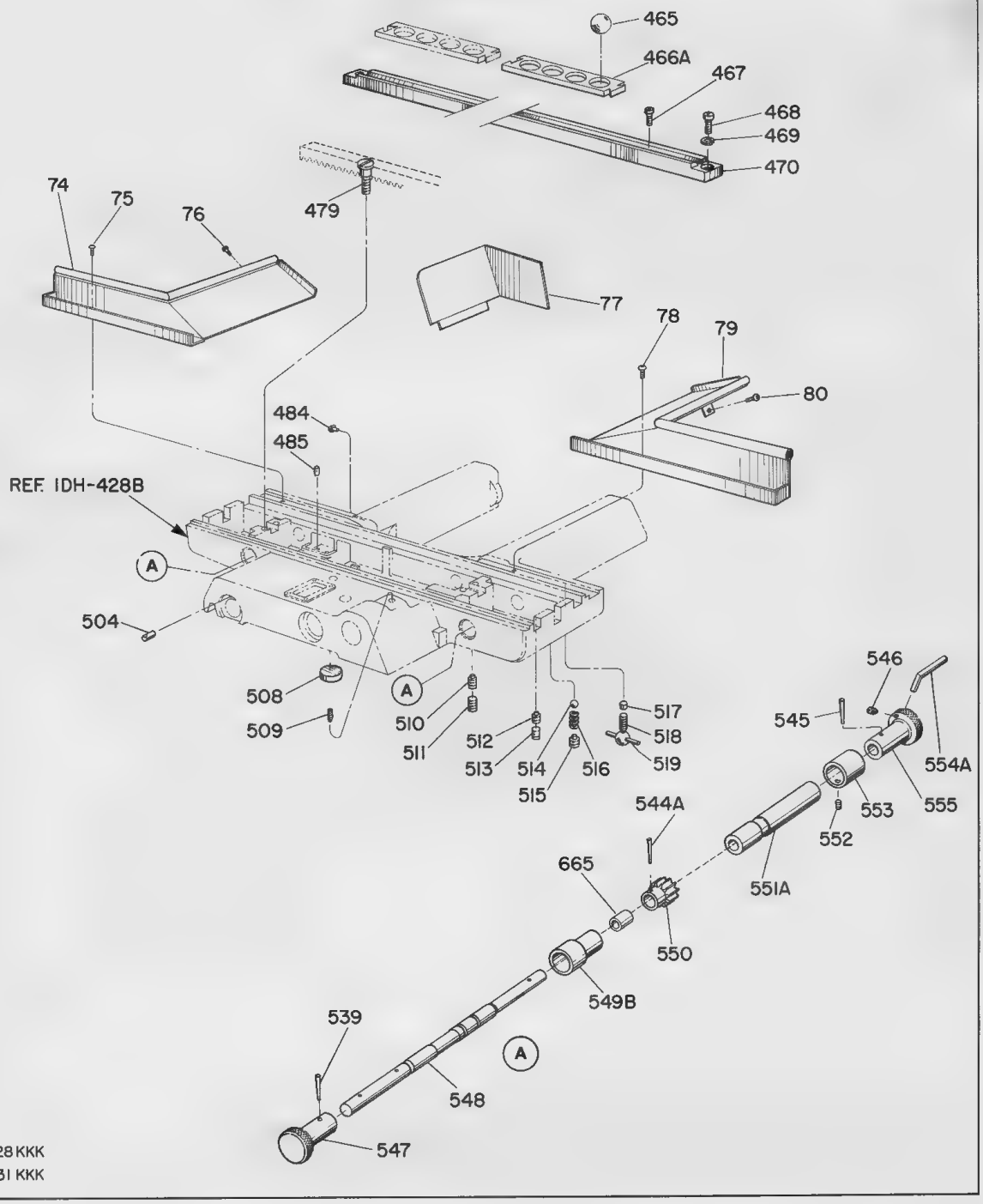
KEY NO.	PART NO.	PART NAME	AMT. USED
1DH-409	3266	Screw	3
1DH-412	*Example	Motor - 1/6 HP, 1140 RPM, Frame 44	1
1DH-419	126928	Bushing	1
1DH-420	159915	Wheel - Worm, Final Drive	1
1DH-421	126928	Bushing	1
1DH-423	2363	Screw	4
1DH-424	*249738	Switch - Limit	1
1DH-425	68205	Pin	1
1DH-428B	184634	Saddle - 24" Table Travel	1
1DH-431	3233	Screw	2
1DH-435	345	Key	1
1DH-436	123793	Bearing - Ball	1
1DH-438	3228	Screw	1
1DH-439	223632	Bearing - Ball	1
1DH-440A	191621	Shaft - Worm	1
1DH-441	126933	Coupling	1
1DH-442	30059	Ring - Spring	1
1DH-443	2363	Screw (Without Power Feed)	4
1DH-444	159919	Cover - Limit Switch Opening (Without Power Feed)	1
1DH-445	159920	Gasket - Cover (Without Power Feed)	1
1DH-446A	191623	Shaft - Pinion	1
1DH-447	126929	Bushing	1
1DH-449A	191622	Shaft - Worm	1
1DH-450	3280	Key	1
1DH-451A	261831	Bearing - Ball	1
1DH-455A	261831	Bearing - Ball	1
1DH-456A	191620	Wheel - Worm	1
1DH-459A	191639	Shifter	1
1DH-461	663	Pin - Taper	1
1DH-462	126932	Lever - Shifter	1
1DH-463	112632	Screw - Reverse Lever	1
1DH-464A	3554	Plug (Without Power Feed)	1
1DH-666	113079	Ring - Retaining	1
1DH-667	191617	Collar - Shifter	2
1DH-668	113079	Ring - Retaining	1
1DH-669	3342	Fitting - Lubrication	1
1DH-671	191624	Adapter - Housing, Power Feed	1
1DH-672	191616	Spacer - Bearing	1
1DH-673A	3399	Screw	4
1DH-674	3369	Pin	2
1DH-675A	3399	Screw	4
1DH-676	191615	Retainer - Bearing	1
1DH-677	191625	Housing - Power Feed	1
1DH-678	3229	Screw	1
1DH-679	2245	Plug (Without Power Feed)	2
1DH-680	1917	Screw (Without Power Feed)	4
1DH-681	191619	Nut - Retainer	1
1DH-682	191618	Retainer - Bearing	1
1DH-683	191619	Nut - Retainer	1
1DH-684	2371	Screw	4
1DH-685	191618	Retainer - Bearing	1
1DH-686	2371	Screw	4
1DH-687	193394	Cover - Switch	1
1DH-688	2363	Screw	2

*When ordering replacement, give electrical requirements and the serial number of the machine.

SADDLE-TABLE

BALL TRACK, TABLE HAND FEED, SPLASH GUARD

24" TABLE TRAVEL

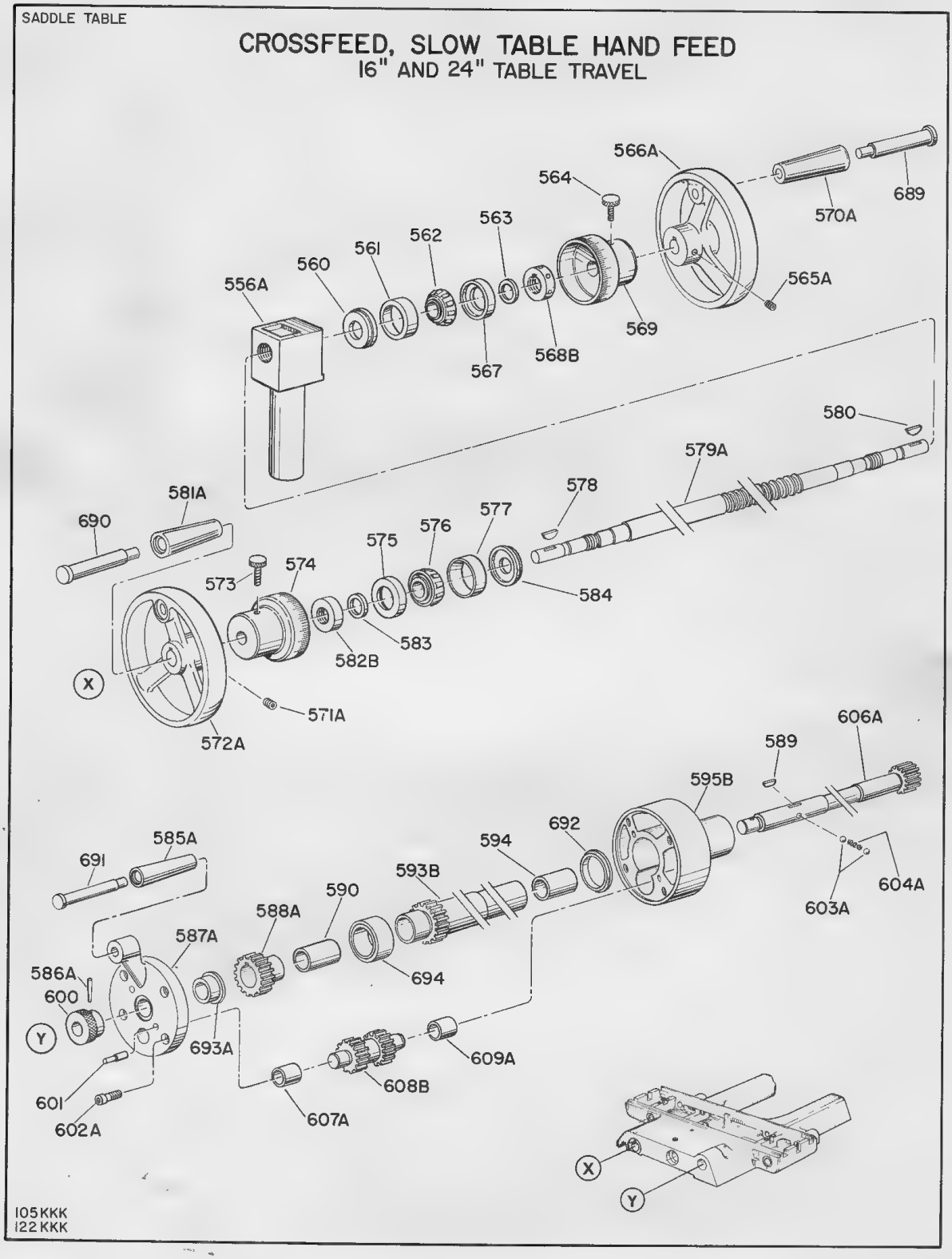


SADDLE TABLE – UNIT 1 DH (Continued)

KEY NO.	PART NO.	PART NAME	AMT. USED
1DP-74	191658	Guard - Splash, L. H.	1
1DP-75	2368	Screw	1
1DP-76	2375	Screw	1
1DP-77	193390	Guard - Splash, L. H. Rear	1
1DP-78	2368	Screw	1
1DP-79	191659	Guard - Splash, R. H.	1
1DP-80	2375	Screw	1
1DH-465	68489	Ball - 3/4"	48
1DH-466A	184646	Cage - Ball	12
1DH-467	3396	Screw	20
1DH-468	3400	Screw	4
1DH-469	2135	Washer	4
1DH-470	159903	Track - Ball	2
1DH-479	140209	Stud - Safety	4
1DH-484	2209	Screw	1
1DH-485	2251	Plug	2
1DH-504	79980	Pin - Index	2
1DH-508	3559	Plug - 3" Standard	1
1DH-509	3233	Screw	1
1DH-510	3233	Screw	2
1DH-511	3211	Screw	2
1DH-512	1917	Screw	2
1DH-513	3232	Screw	2
1DH-514	13665	Ball - 5/16" Diameter	2
1DH-515	3232	Screw	2
1DH-516	262	Spring	2
1DH-517	1962	Plug	2
1DH-518	3536	Screw	2
1DH-519	3537	Handle	2
1DH-539	642	Pin - Taper	2
1DH-544A	148097	Pin - Taper	2
1DH-545	642	Pin - Taper	2
1DH-546	1911	Screw	2
1DH-547	129716	Knob - Shaft	2
1DH-548	126815	Shaft - Hand Feed	2
1DH-549B	180232	Bushing - Front Hand Feed Shaft	2
1DH-550	107411	Pinion	2
1DH-551A	180233	Bushing - Rear Hand Feed Shaft	2
1DH-552	3228	Screw	2
1DH-553	79962	Guard - Handwheel	2
1DH-554A	67947	Lever - Shaft Hand Feed	2
1DH-555	130019	Knob - Shaft	2
1DH-665	191653	Bushing - Oilite	2

SADDLE TABLE

CROSSFEED, SLOW TABLE HAND FEED
16" AND 24" TABLE TRAVEL



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122KKK

SADDLE TABLE – UNIT 1 DH (Continued)

KEY NO.	PART NO.	PART NAME	AMT. USED
1DH-556A		Nut - Crossfeed	
	193336	Inch System	1
	193337	Metric	1
1DH-560	129704	Retainer - Grease	1
1DH-561	201806	Cup - Bearing	1
1DH-562	201811	Cone - Bearing	1
1DH-563	126829	Washer - Bearing	1
1DH-564	77200	Screw - Thumb	1
1DH-565A	3234	Screw	1
1DH-566A	188934	Handwheel	1
1DH-567	129703	Retainer - Grease	1
1DH-568B	4184	Nut - Lock	1
1DH-569		Dial - Crossfeed, Rear	
	129709	Inch System	1
	130325	Metric	1
1DH-570A	187974	Handle	1
1DH-571A	3234	Screw	1
1DH-572A	188934	Handwheel	1
1DH-573	77200	Screw - Thumb	1
1DH-574		Dial - Crossfeed, Front	
	129710	Inch System	1
	130324	Metric	1
1DH-575	129703	Retainer - Grease	1
1DH-576	201811	Cone - Bearing	1
1DH-577	201806	Cup - Bearing	1
1DH-578	3280	Key	1
1DH-579A		Screw - Crossfeed	
	184625	Inch System	1
	184626	Metric	1
1DH-580	3280	Key	1
1DH-581A	187974	Handle	1
1DH-582B	4184	Nut - Lock	1
1DH-583	126829	Washer - Bearing	1
1DH-584	129704	Retainer - Grease	1
1DH-585A	187974	Handle	1
1DH-586A	143	Pin - Taper	1
1DH-587A	191609	Cover - Housing	1
1DH-588A	193378	Gear - Table	1
1DH-589	1266	Key	1
1DH-590	126847	Bushing - Oilite	1
1DH-593B	193377	Gear - Table Feed Sleeve	1
1DH-594	126847	Bushing - Oilite	1
1DH-595B	191612	Housing - Differential Gear	1
1DH-600	62498	Knob - On Table Feed Shaft	1
1DH-601	1421	Pin	1
1DH-602A	3399	Screw	4
1DH-603A	30060	Ball - Steel	2
1DH-604A	101732	Spring	1
1DH-606A	191607	Shaft - Long Table Feed	1
1DH-607A	602122	Bushing	1
1DH-608B	193379	Gear - On Table Feed Stud	1
1DH-609A	602122	Bushing	1
1DH-689	187575	Stud	1
1DH-690	187575	Stud	1
1DH-691	187575	Stud	1
1DH-692	191606	Spacer	1
1DH-693A	304628	Bushing	1
1DH-694	137508	Bearing - Needle	1

TO REMOVE CROSS FEED SCREW (579A, RP20) AND NUT (556A, RP20) AND SADDLE (428B, RP16)

1. Run saddle fully forward. Loosen set screw (565A, RP20), knurled thumb screw (564) and remove rear handwheel (566A), dial (569) and key (580). Loosen set screw in nut, tap screw to loosen lock shoe under it, and remove shoe type lock nut (568B). Using front handwheel (572A) turn left-hand cross feed screw clockwise out of saddle. Front bearing and seal will emerge with screw. Screw will be forced out of rear bearing cone.

2. Place rope slings around ends of saddle and pick it up off the base with a crane.

3. Remove two set screws (31, 32, RP30) from side of bed and tap cross feed nut (556A) up out of bed.

When assembling, allow cross feed nut to remain free until saddle and cross feed screw have been replaced and tested for freedom of movement before locking nut with the set screws. It is best to install a new screw and nut in case either shows wear.

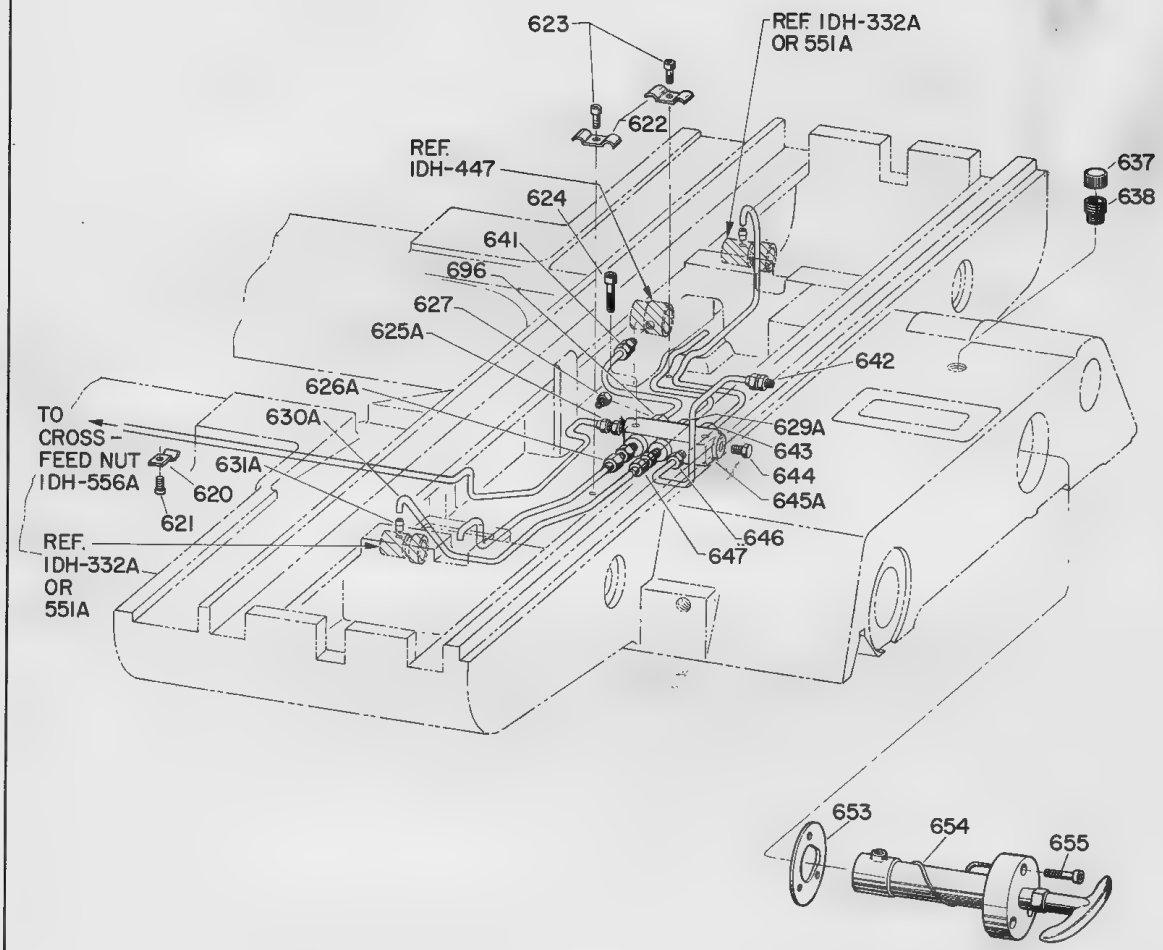
The taper bearings on ends of cross feed screw should be so adjusted that handwheels have no more than .005" rotary play. The inner edge of dials must clear sides of saddle and cross screw should protrude an equal amount past handwheel hubs.

TO REMOVE TABLE FEED PINION SHAFT ASSEMBLY (606A, RP20)

Remove set screw (313, RP14 or 509, RP18) and pull shaft assembly out front of bed.

SADDLE TABLE

SADDLE TABLE LUBRICATION



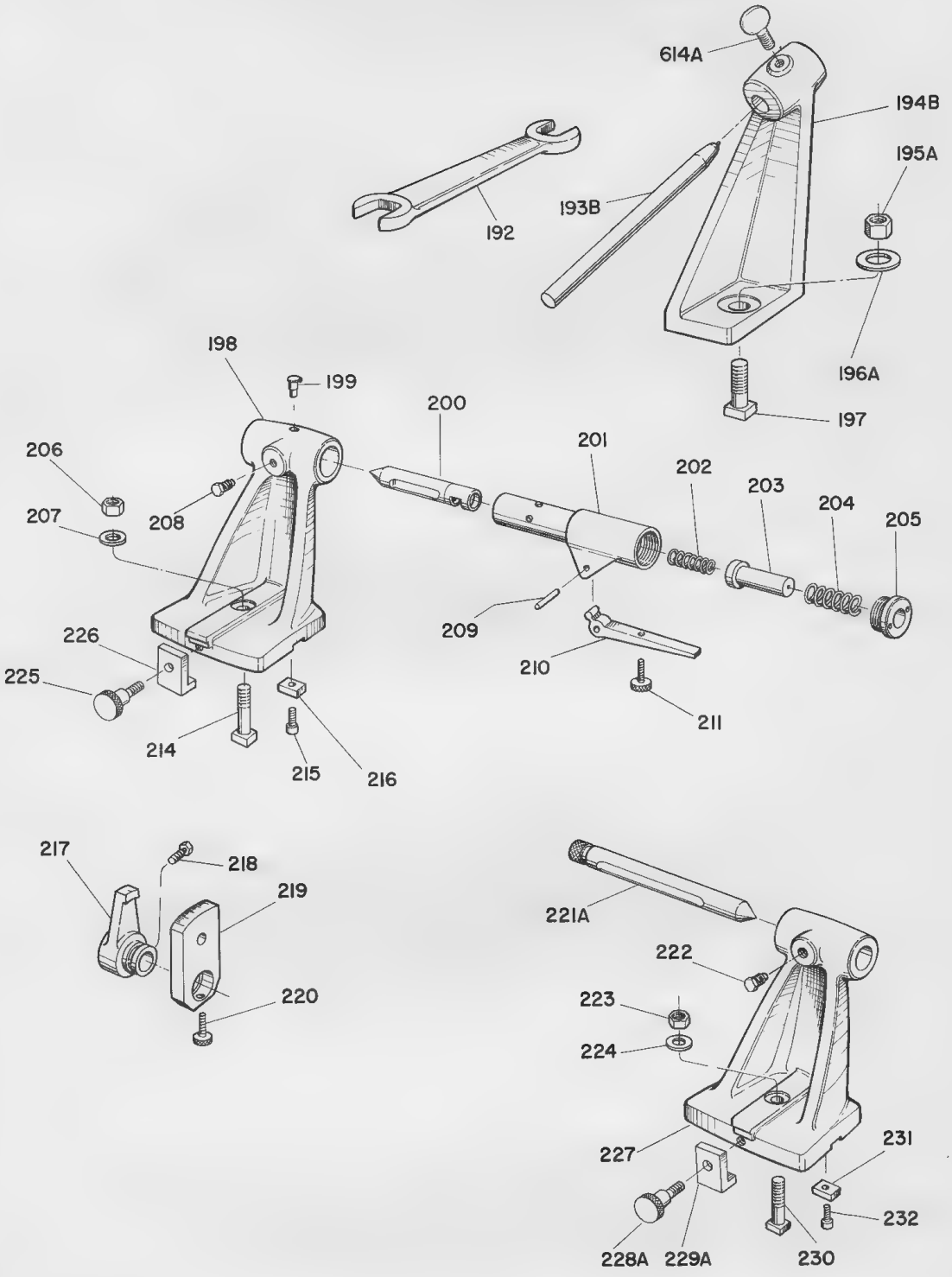
124KKK

SADDLE TABLE – UNIT 1 DH (Continued)

KEY NO.	PART NO.	PART NAME	AMT. USED
1DH-620	220002	Clip - Tubing	1
1DH-621	3198	Screw	1
1DH-622	126912	Clip - Double, Tubing	2
1DH-623	3198	Screw	2
1DH-624	3227	Screw	2
1DH-625B		Fitting	
	214294	Nut - Compression	1
	214304	Sleeve - Compression	1
	220003	Plug - Drip #2	1
1DH-626A		Fitting	
	214294	Nut - Compression	1
	214304	Sleeve - Compression	1
	220003	Plug - Drip #2	1
1DH-627	77411	Plug - Closure (Used Without Power Feed)	1
1DH-629A		Fitting	
	214294	Bushing - Compression	1
	214304	Sleeve - Compression	1
	220003	Plug - Drip #2	1
1DH-630A	191652	Tubing - List	AR
1DH-631A	77197	Bushing - Tube	2
1DH-637	3986	Cap - Oil Filler	1
1DH-638	71937	Adapter - Filler Cap	1
1DH-641		Fitting (With Power Feed Only)	
	214300	Bushing - Compression	1
	214303	Adapter - Straight Type "F"	1
	214304	Sleeve - Compression	1
1DH-642		Fitting	
	214300	Bushing - Compression	1
	214303	Adapter - Straight Type "F"	1
	214304	Sleeve - Compression	1
1DH-643		Fitting	
	214294	Nut - Compression	2
	214304	Sleeve - Compression	2
	220004	Plug - Drip #0	2
1DH-644	77411	Plug - Closure	1
1DH-645A	143766	Junction - Eight Way	1
1DH-646		Fitting	
	214300	Bushing - Compression	1
	214304	Sleeve - Compression	1
1DH-647		Fitting	
	214294	Nut - Compression	2
	214304	Sleeve - Compression	2
	220004	Plug - Drip #0	2
1DH-653	------	Gasket - Supplied with Pump	1
1DH-654	129701	Pump - Lubricator	1
1DH-655	3227	Screw	4
1DH-696		Fitting (With Power Feed Only)	
	214294	Nut - Compression	1
	214304	Sleeve - Compression	1
	77196	Plug - Drip #1	1

SADDLE TABLE

TAILSTOCK - DIAMOND BRACKET

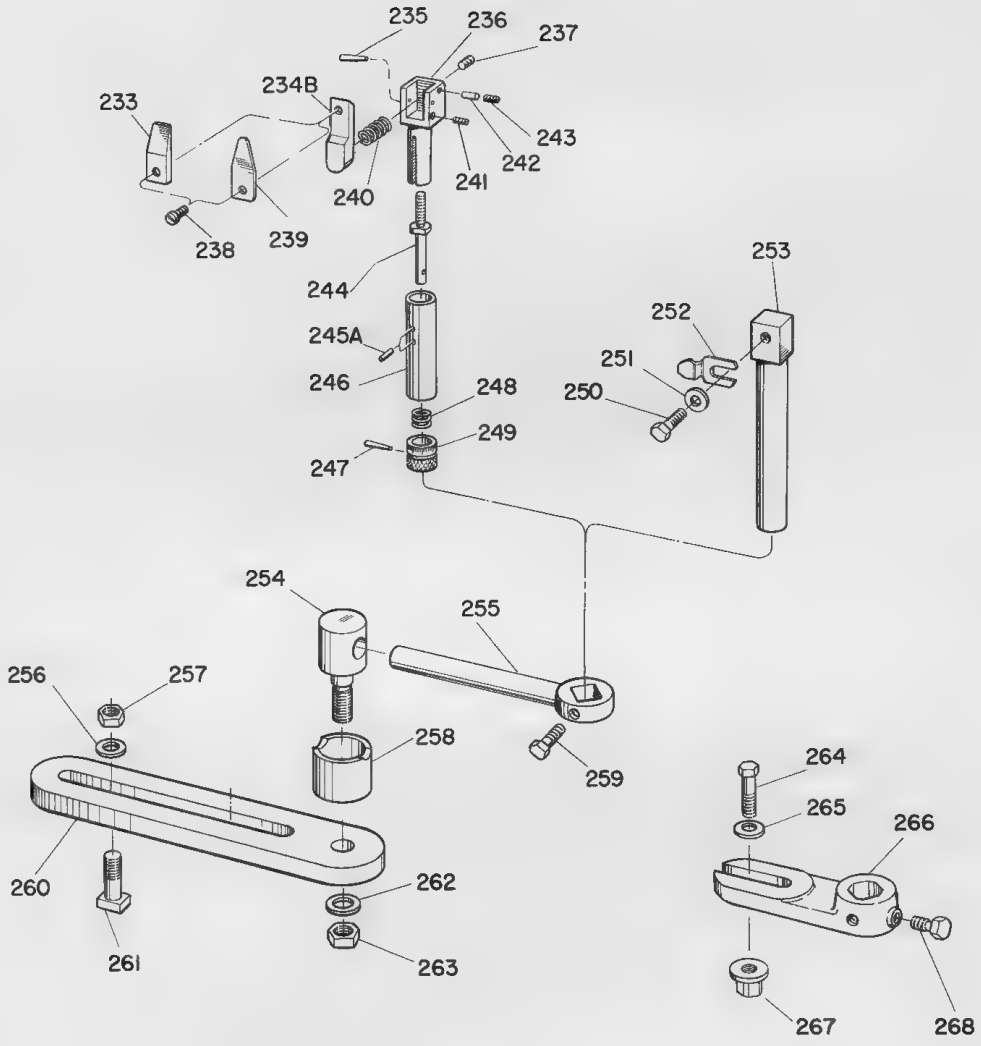


SADDLE TABLE – UNIT 1 DH (Continued)

KEY NO.	PART NO.	PART NAME	AMT. USED
1DH-192	19476	Wrench (7/8 x 9/16)	1
1DH-193B	155111	Nib - Diamond	1
1DH-194B	31381	Bracket - Diamond	1
1DH-195A	3479	Nut	1
1DH-196A	3442	Washer	1
1DH-197	1745	Bolt - Tee	1
1DH-198	149571	Bracket - Tailstock, Right Hand	1
1DH-199	44980	Cup - Oil	1
1DH-200	143744	Center - Right Hand Tailstock	1
1DH-201	143746	Housing - Tailstock	1
1DH-202	150021	Spring	1
1DH-203	143749	Plunger - Spring	1
1DH-204	143747	Spring	1
1DH-205	143748	Retainer - Cap	1
1DH-206	3479	Nut	1
1DH-207	3442	Washer	1
1DH-208	143741	Screw - Lock	1
1DH-209	3542	Pin - For Lever	1
1DH-210	143740	Lever - Tailstock	1
1DH-211	77200	Screw - Thumb	1
1DH-212	59	Screw - Thumb	1
1DH-214	3309	Bolt - Tee	1
1DH-215	3486	Screw	2
1DH-216	3312	Tongue	2
1DH-217	65470	Body - Clearance Setting	1
1DH-218	489	Screw	1
1DH-219	65471	Plate - Clearance Setting Dial	1
1DH-220	2255	Screw - Thumb	1
1DH-221A	64099	Center - Left Hand Tailstock	1
1DH-222	143741	Screw - Lock	1
1DH-223	3479	Nut	1
1DH-224	3442	Washer	1
1DH-225	159914	Screw - Thumb	1
1DH-226	159913	Clamp - Workhead	1
1DH-227	149572	Bracket - Tailstock, Left Hand	1
1DH-228A	159914	Screw - Thumb	1
1DH-229A	159913	Clamp - Workhead	1
1DH-230	3309	Bolt - Tee	1
1DH-231	3312	Tongue	2
1DH-232	3486	Screw	2
1DH-614A	62	Nut - Wing	1

SADDLE TABLE

BLADE SUPPORTS



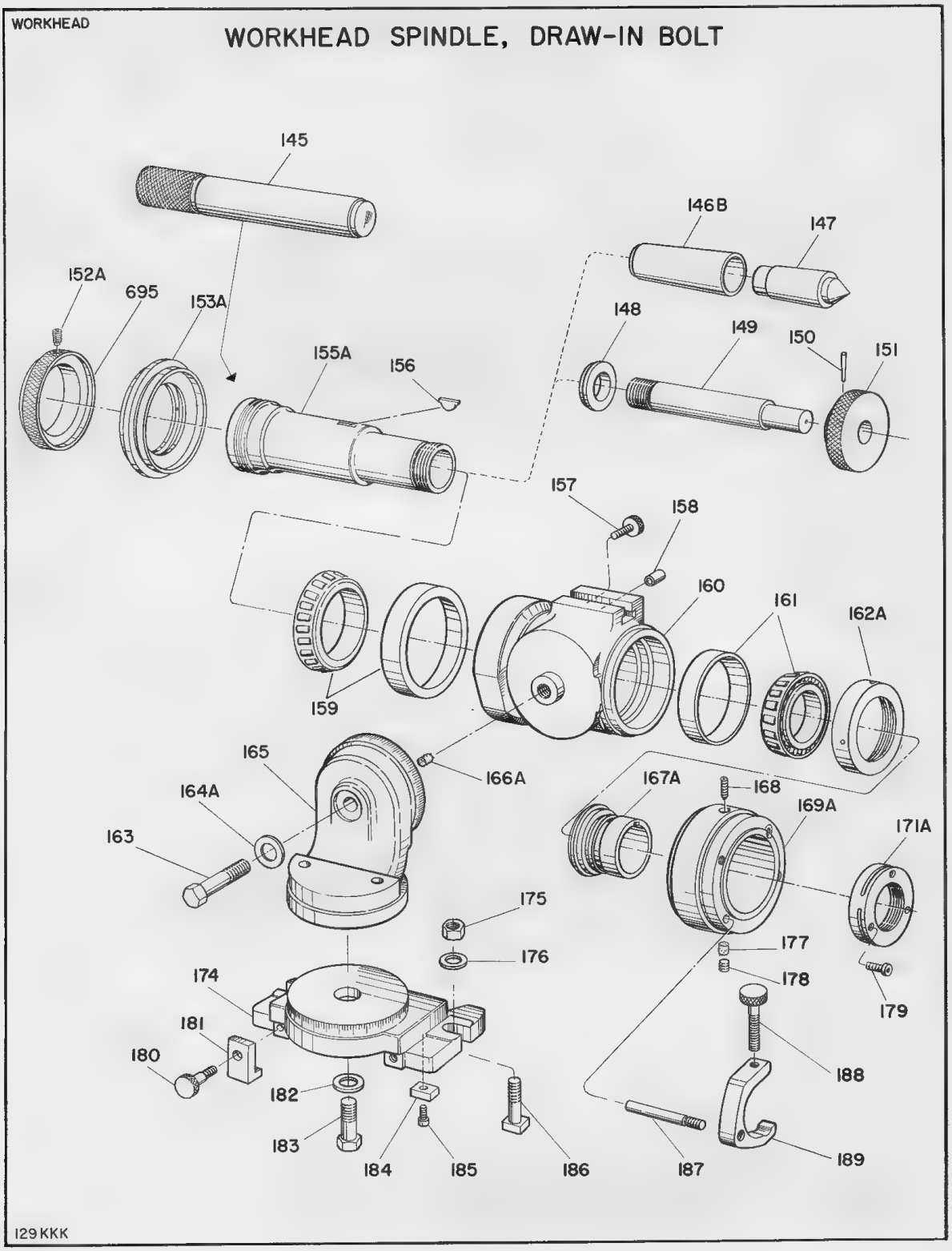
27KKK

SADDLE TABLE – UNIT 1 DH (Concluded)

KEY NO.	PART NO.	PART NAME	AMT. USED	KEY NO.	PART NO.	PART NAME	AMT. USED
1DH-233	64894	Blade - Square Top, 1/2" Wide	1	1DH-251	3441	Washer	1
1DH-234B	64899	Block - Swivel Blade Holder	1	1DH-252	65624	Blade - Plain Support	1
1DH-235	141	Pin - Taper	1	1DH-253	64903	Support - Blade, Plain	1
1DH-236	64901	Support - Blade, Adjustable	1	1DH-254	26243	Bolt - Eye, For Clamp	1
1DH-237	1879	Screw	1	1DH-255	31436	Extension	1
1DH-238	1650	Screw	1	1DH-256	3442	Washer	1
1DH-239	65657	Blade - Round Top	1	1DH-257	3479	Nut	1
1DH-240	727	Spring	1	1DH-258	23291	Ring - For Clamp	1
1DH-241	1205	Screw	1	1DH-259	489	Screw	1
1DH-242	1994	Plug	1	1DH-260	22684	Plate - Extension	1
1DH-243	2279	Screw	1	1DH-261	3311	Bolt - Tee	1
1DH-244	64897	Screw - Adjusting	1	1DH-262	3442	Washer	1
1DH-245A	193320	Pin	2	1DH-263	3479	Nut	1
1DH-246	67906	Sleeve - Blade Support	1	1DH-264	641	Screw	1
1DH-247	140	Pin - Taper	1	1DH-265	3441	Washer	1
1DH-248	253	Spring	1	1DH-266	66751	Block - Clamp	1
1DH-249	64900	Dial - Graduated	1	1DH-267	64906	Nut - Clamping	1
1DH-250	49	Screw	1	1DH-268	489	Screw	1

WORKHEAD

WORKHEAD SPINDLE, DRAW-IN BOLT



WORKHEAD – UNIT 1DGC

KEY NO.	PART NO.	PART NAME	AMT. USED
1DGC-145	64854	Rod - Collet Extracting	1
1DGC-146A		Collet	
	23052	12 to 7 B & S Taper	1
	7487	12 to 9 B & S Taper	1
	7488	12 to 10 B & S Taper	1
	139687	#5 to #2 Morse Taper	1
	139688	#5 to #3 Morse Taper	1
	139689	#5 to #4 Morse Taper	1
1DGC-147		Center	
	69049	12 B & S Taper	1
	96789	#5 Morse Taper	1
1DGC-148	62465	Collar - Draw In Bolt	1
1DGC-149	69847	Bolt - Draw In	1
1DGC-150	642	Pin - Taper	1
1DGC-151	62464	Knob - Draw In	1
1DGC-152A	3229	Screw	1
1DGC-153A	191635	Cap - Dust	1
1DGC-155A		Spindle - Workhead	
	191637	12 B & S Taper	1
	191669	#5 Morse Taper	1
1DGC-156	3279	Key	1
1DGC-157	67401	Screw - Thumb	1
1DGC-158	40553	Oiler	1
1DGC-159	69845	Bearing	1
1DGC-160	69842	Head - Work	1
1DGC-161	69844	Bearing	1
1DGC-162A	191633	Ring - Dust (Small)	1
1DGC-163	3427	Screw	1
1DGC-164A	112	Washer	1
1DGC-165	62561	Support - Workhead	1
1DGC-166A	178264	Plug	1
1DGC-167A	191634	Bushing - Cutter Dial	1
1DGC-168	3455	Screw	1
1DGC-169A	191636	Dial - Cutter Setting	1
1DGC-171A	196473	Nut - Lock	1
1DGC-174	156160	Plate - Work	1
1DGC-175	3479	Nut	2
1DGC-176	3442	Washer	2
1DGC-177	1936	Plug	1
1DGC-178	1215	Screw	1
1DGC-179	3203	Screw	3
1DGC-180	159914	Screw - Thumb	2
1DGC-181	159913	Clamp - Workhead	2
1DGC-182	1040	Washer	1
1DGC-183	3428	Bolt	1
1DGC-184	3312	Tongue	2
1DGC-185	3486	Screw	2
1DGC-186	3311	Bolt	2
1DGC-187	62687	Pin - Dog Setting	1
1DGC-188	24896	Screw - Dog Setting	1
1DGC-189	62656	Dog - Setting	1
1DGC-695	191689	Cap - Drive, Workhead	1

TO REMOVE WORK HEAD SPINDLE (155A, RP28)

1. Remove lock nut (171A) from spindle and loosen set screw (168) in top of cutter setting dial. Slip cutter setting dial (169A) and bushing (167A) from rear of workhead.

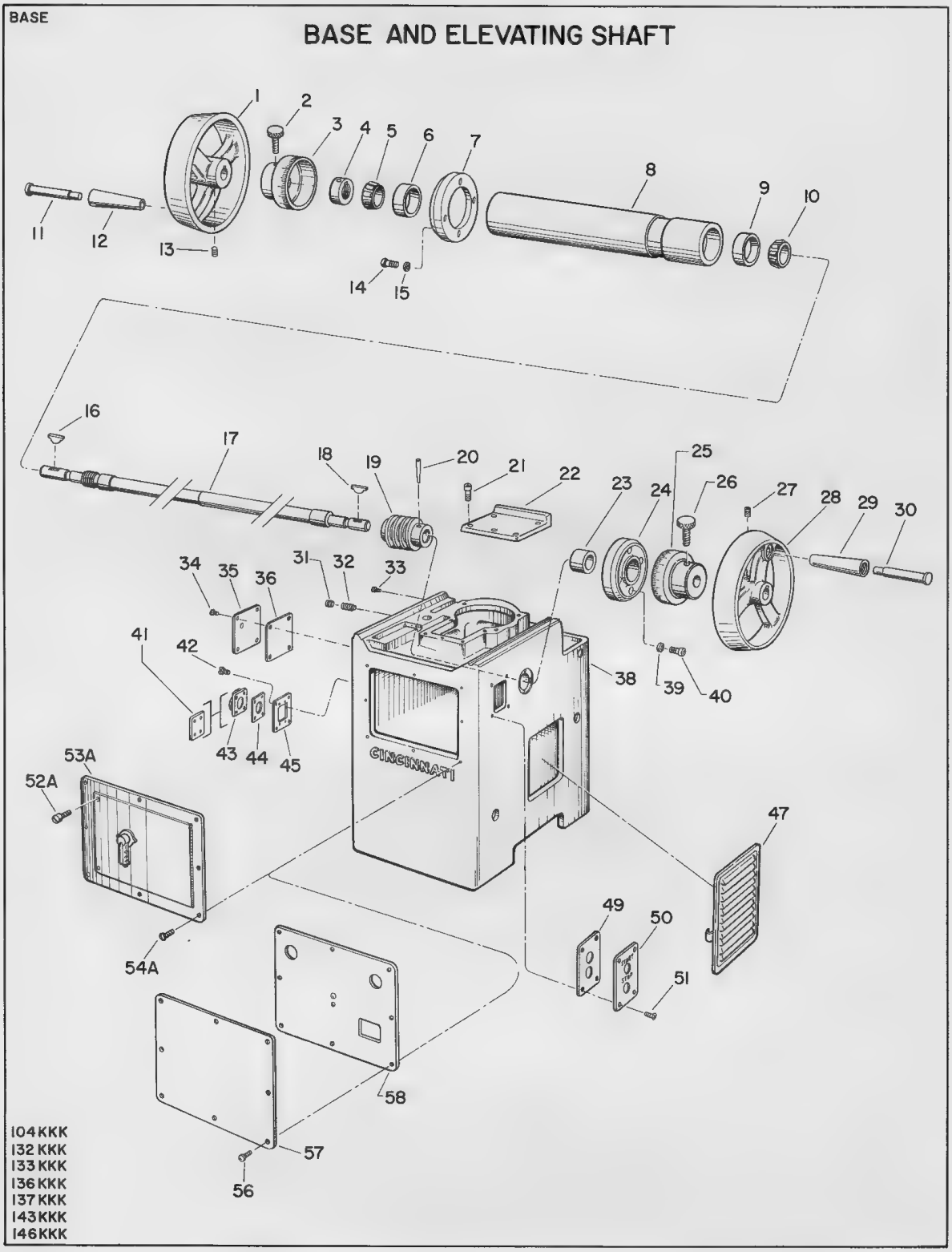
   Remove key (156). This should be a nice fit in both spindle and bushing.

2. Loosen knurled thumb screw (157), place draw in bolt (149) assembly back into workhead spindle (155A) and tap spindle forward out of workhead.

   Examine the dust ring (162A) on workhead, dust cap (153A) and cutter setting dial (169A), and the drive cap (695) on spindle, for any evidence of rubbing. The clearance between these parts is very small and any mishandling or bumping while off will cause contact and aside from making it hard to rotate workhead, it may cause run out.

BASE

BASE AND ELEVATING SHAFT



BASE – UNIT 1 DAB

KEY NO.	PART NO.	PART NAME	AMT. USED
1DAB-1	188934	Handwheel	1
1DAB-2	77200	Screw - Thumb	1
1DAB-3		Dial - Elevating, Left Hand	
	129740	Inch System	1
	129759	Metric	1
1DAB-4	110202	Nut - Lock	1
1DAB-5	77264	Cone - Bearing	1
1DAB-6	72141	Cup - Bearing	1
1DAB-7	191684	Adapter - Bearing, Left Side	1
1DAB-8	191693	Sleeve - Elevating Mechanism	1
1DAB-9	72141	Cup - Bearing	1
1DAB-10	77264	Cone - Bearing	1
1DAB-11	187975	Stud	1
1DAB-12	187974	Handle	1
1DAB-13	3498	Screw - Set	1
1DAB-14	3396	Screw - Cap	4
1DAB-15	936	Washer	4
1DAB-16	3280	Key	1
1DAB-17	191687	Shaft - Elevating Worm	1
1DAB-18	3280	Key	1
1DAB-19	191692	Gear - Worm, Elevating	1
1DAB-20	663	Pin - Taper	1
1DAB-21	3404	Screw - Cap	5
1DAB-22	191332	Cover - Base, Top	1
1DAB-23	601526	Bushing - Oilite	1
1DAB-24	191696	Adapter - Bearing, Right Side	1
1DAB-25		Dial - Elevating, Right Hand	
	129739	Inch System	1
	129758	Metric	1
1DAB-26	77200	Screw - Thumb	1
1DAB-27	3498	Screw - Set	1
1DAB-28	188934	Handwheel	1
1DAB-29	187974	Handle	1
1DAB-30	187975	Stud	1
1DAB-31	1910	Screw - Set	1
1DAB-32	3243	Screw - Set	1
1DAB-33	2209	Screw - Drive	1
1DNN-34	2368	Screw - Button Head Cap	4
1DNN-35		Plate - Electrical Direction	
	170779	English	1
	196480	Symbolized	1
1DNN-36	160007	Plate - Switch Mounting	1
1DAB-38	184637	Base	1
1DAB-39	936	Washer	4
1DAB-40	3396	Screw - Cap	4
1DM-41	Example	Cover - Blank, #DS-100 (If no conduit cover is used)	1
1DN-42	143696	Screw - Self Tapping	4
1DM-43	141239	Cover - Conduit	1
1DM-44	Example	Gasket - Neoprene #1014	1
1DN-45	160010	Plate - Outlet Mounting	1
1DAB-47	3975	Louver	2
1DNN-49	160005	Plate - Switch Mounting	1
1DNN-50		Plate - Electrical Control	
	158230	English	1
	196481	Symbolized	1
1DNN-50	158230	Plate - Electrical Control	1
1DNN-51	143696	Screw - Self Tapping	4
1DN-52A	249367	Screw	2
1DN-53A		Assembly - Door and Frame, Electrical Panel (Without Power Feed)	
	304500	With or Without Coolant	1
	304506	With or Without Coolant, with Radius Grinding or End Mill Grinding Attachments	1
1DN-54A	2369	Screw - Self Tapping	8
1DNN-56		Screw - Self Tapping	
	258745	Use with Plate 159997	8
	2311	Use with Plate 173032	8
1DNN-57		Plate - Electrical Direction	
	173032	With Power Feed	1
	196482	Symbolized	1
	159997	With or Without Coolant, With Radius Grinding or End Mill Grinding Attachments	1
	308809	Symbolized	1
1DNN-58	160024	Plate - Electrical Mounting (With Power Feed)	1

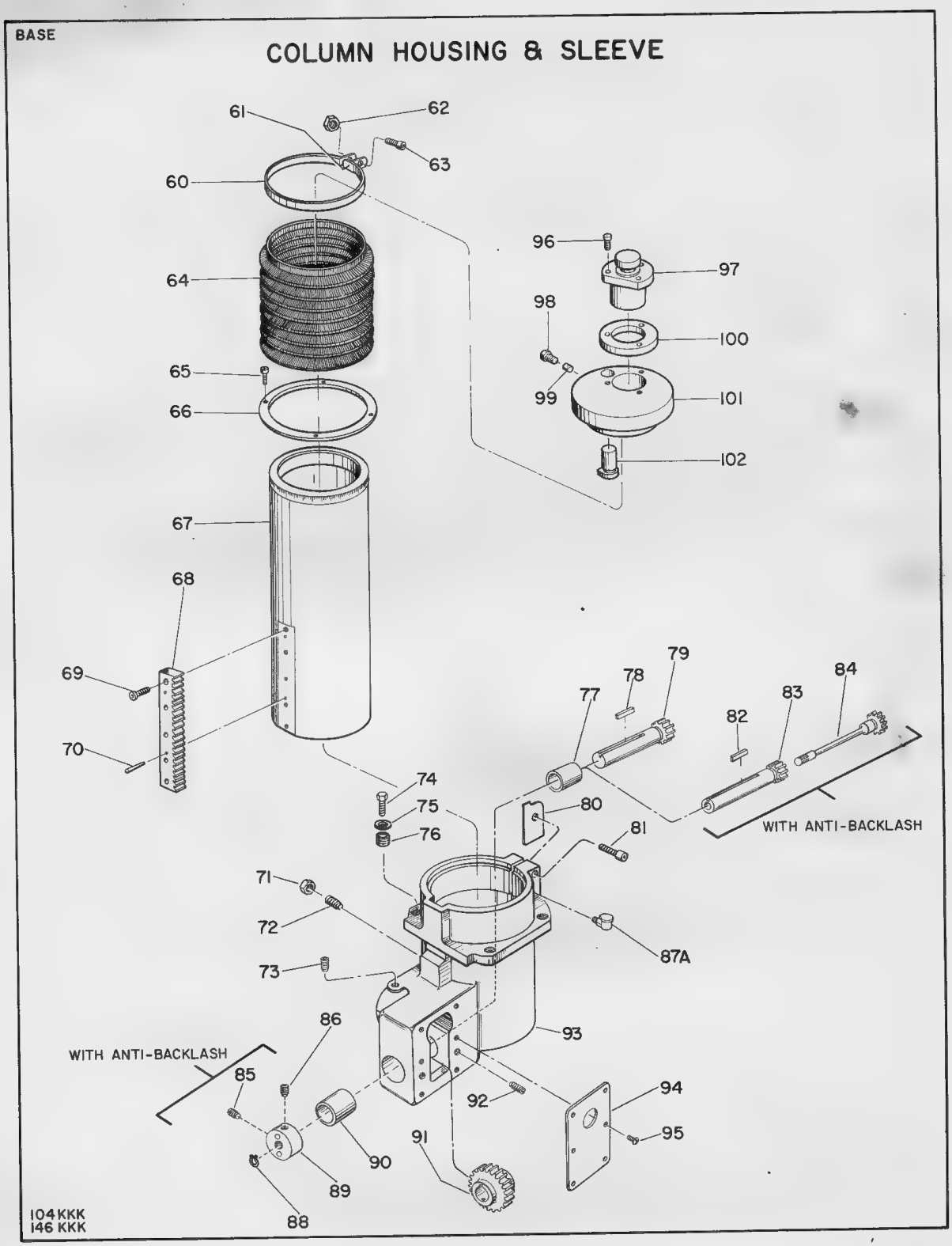
TO REMOVE ELEVATING WORM SHAFT (17, RP30)

1. Take off louver (47, RP30) and tighten screw (81, RP32) to keep column from dropping when elevating shaft is removed.

   After assembly, retighten clamping screw (81) only sufficiently so weight of sleeve and wheelhead will always cause rack (68) to rest on elevating pinion (79). thus, any possible backlash is always eliminated.

2. Loosen screws (26 and 27, RP30), remove handwheel and dial and lift out key (18) from right end of elevating shaft. Loosen set screw (73, RP32) holding sleeve (8, RP30).

   Using left side handwheel rotate elevating shaft counterclockwise out of base. Items 1 through 20 will emerge together.


BASE
COLUMN HOUSING & SLEEVE
61
62
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60
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65
66
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69
70
96
97
98
100
99
101
102
74
75
76
77
78
79
80
81
82
83
84
WITH ANTI-BACKLASH
71
72
73
87A
86
93
WITH ANTI-BACKLASH
85
92
94
95
90
91
89
88
104 KKK
146 KKK

BASE – UNIT 1 DAB (Concluded)

KEY NO.	PART NO.	PART NAME	AMT. USED
1DAB-60	103361	Ring - Sleeve	1
1DAB-61	105653	Plate - Sleeve Ring	1
1DAB-62	3477	Nut - Hex	1
1DAB-63	3396	Screw - Cap	1
1DAB-64	103072	Guard - Dust	1
1DAB-65	3203	Screw - Cap	4
1DAB-66	103159	Ring - Housing	1
1DAB-67	154414	Sleeve - Column	1
1DAB-68	126797	Rack - Elevating	1
1DAB-69	3209	Screw - Cap	5
1DAB-70	739	Pin - Taper	2
1DAB-71	3474	Nut - Hex	1
1DAB-72	3240	Screw - Set	1
1DAB-73	259272	Screw - Set	1
1DAB-74	3463	Screw - Hex Head	4
1DAB-75	3442	Washer	4
1DAB-76	78386	Bushing - Adjusting	4
1DAB-77	184607	Bearing - Sleeve, Oilite	1
1DAB-78	814	Key	1
1DAB-79	191697	Pinion - Rack, Elevating	1
1DAB-80	64790	Gasket - Housing	1
1DAB-81	1930	Screw - Cap	1
1DAB-82	814	Key (With Anti-Backlash)	1
1DAB-83	184608	Pinion - Rack, Elevating (With Anti-Backlash)	1
1DAB-84	191643	Pinion - Anti-Backlash (With Anti-Backlash)	1
1DAB-85	700034	Screw - Set (With Anti-Backlash)	1
1DAB-86	700044	Screw - Set (With Anti-Backlash)	1
1DAB-87A	312351	Oiler	2
1DAB-88	236956	Ring - Retaining (With Anti-Backlash)	1
1DAB-89	191685	Cap - Adjusting (With Anti-Backlash)	1
1DAB-90	184607	Bearing - Sleeve, Oilite	1
1DAB-91	184620	Wheel - Elevating Worm	1
1DAB-92	3238	Screw - Set	2
1DAB-93	184619	Housing - Elevating	1
1DAB-94	184621	Cover - Housing	1
1DAB-95	2369	Screw - Button Head Cap	6
1DAB-96	3399	Screw - Cap	3
1DAB-97	189635	Trunnion	1
1DAB-98	741	Screw - Hex Head Set	1
1DAB-99	157037	Plug - Locking	1
1DAB-100	193371	Plate - Head Index	1
1DAB-101	154413	Plate - Mounting	1
1DAB-102	154412	Clamp	1

TO REMOVE WHEELHEAD, (18A, RP4) COLUMN SLEEVE (67, RP32) AND HOUSING (93, RP32)

1. Remove belt guard, grinding wheel guard and grinding wheel from wheelhead.

2. Remove screw (156, RP4) and plug (157) from column sleeve (67, RP32). Place a rope sling around the wheelhead and lift it, with mounting plate (159, RP4) and tilting bracket (77) (if used), straight upward out of the column sleeve.

3. Remove screw (48, RP4) and plug (47) from wheelhead housing (18A) and separate trunnion (155) from the wheelhead housing.

4. Through bottom openings of base remove set screw (72, RP37) from left side of housing (93). (This set screw, riding in a groove of column sleeve, limits vertical movement of sleeve.) Raise sleeve to topmost position with elevating handwheel and remove four screws (65) that fasten dust guard to housing. Remove clamp ring (60) and lift off dust guard (64). Loosen clamp screw (81). Affix an eyebolt to the center of a steel plate ¼" x 1" x 6½", lower plate into sleeve so it catches on inner lip, near top, and raise sleeve out of column.

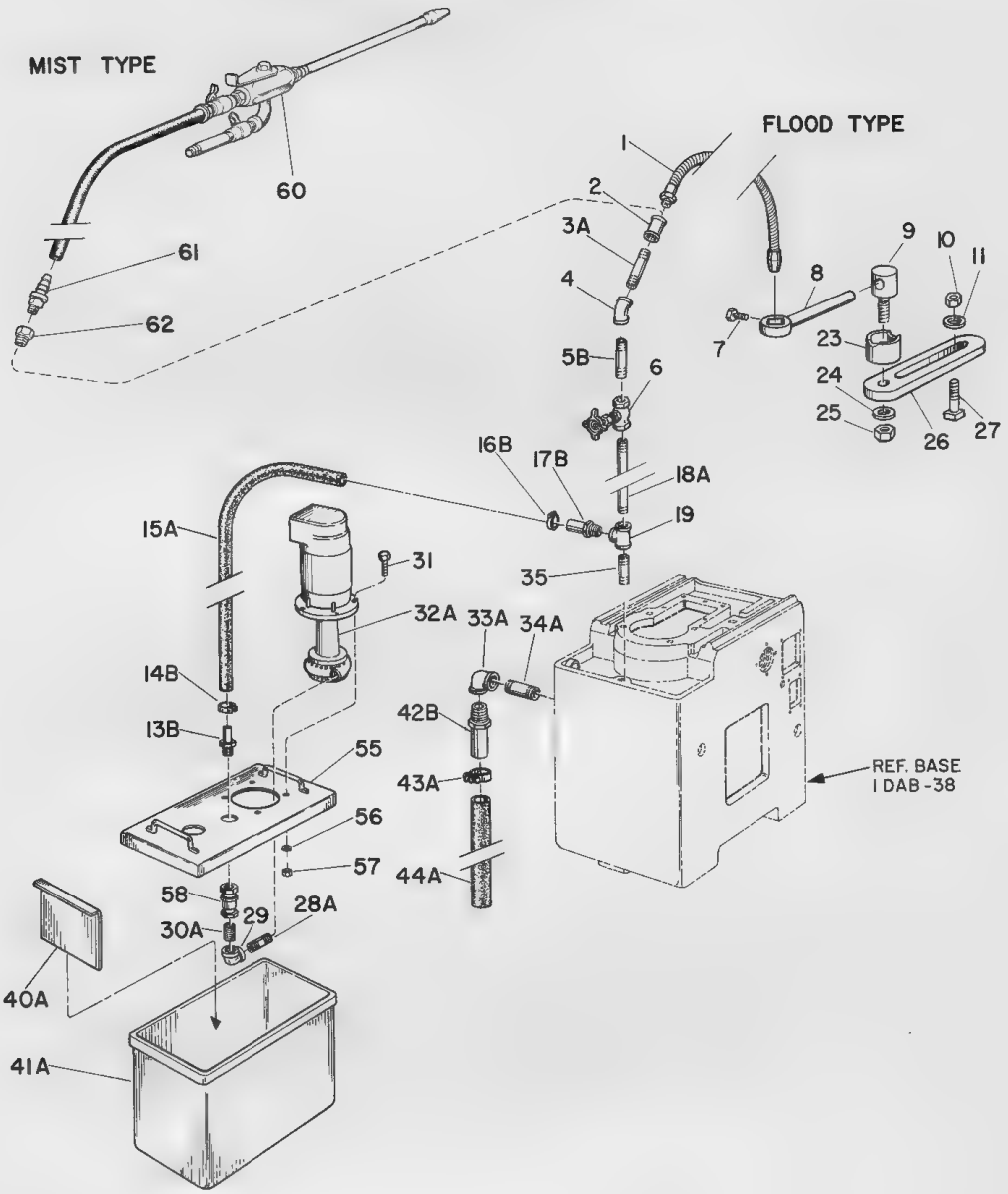
5. Proceed as per instructions on page RP31 and remove elevating worm shaft.

   Remove four screws (74, RP32) from top of housing. Do not alter positions of bushings (76). Affix an eyebolt to the center of a steel plate (¼" x 1" x 9¾"). Lower the plate into the housing at a 45° angle; then straighten plate until it catches on the lip inside the housing and raise the housing out of the base.

After assembly it will be necessary to tram spindle to table in various positions. If necessary, use adjusting bushings (76, RP32) to align spindle to table. Retram after hold-down screws (74) have been tightened.

When reassembling, eliminate backlash between rack (68, RP32) and elevating pinion (91) by tightening screw (81) so that the weight of the column sleeve and wheelhead maintains contact between the rack and pinion.

COOLANT PUMP AND PIPING



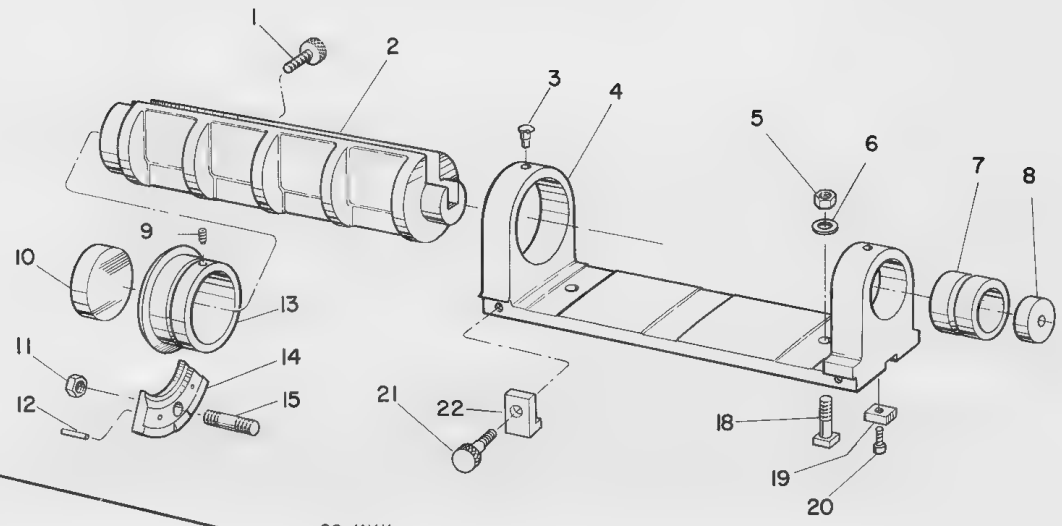
132 KKK
133 KKK
149 KKK

COOLANT PUMP AND PIPING – UNIT 1 DP

KEY NO.	PART NO.	PART NAME	AMT. USED
1DP-1	159945	*Hose - Coolant	1
1DP-2	4065	Coupling - 3/8"	1
1DP-3A	------	Pipe - 3/8" P.S. x 4" lg.	1
1DP-4	37571	Elbow - 3/8 x 45°	1
1DP-5B	205239	Nipple	1
1DP-6	159944	Valve - Needle	1
1DP-7	489	*Screw	1
1DP-8	31436	*Support - Extension Blade Holder	1
1DP-9	26243	*Bolt - Eye for Clamp	1
1DP-10	3479	*Nut	1
1DP-11	3442	*Washer	1
1DP-13B	289234	Nipple - Coolant, Hose	1
1DP-14B	80486	Clamp - Hose	1
1DP-15A	158161	Hose - Coolant	1
1DP-16B	80486	Clamp - Hose	1
1DP-17B	143536	Nipple - Coolant, Hose	1
1DP-18A	------	Pipe - 3/8" P.S. x 17-1/2" lg.	1
1DP-19	89870	Tee - 3/8"	1
1DP-23	23291	*Ring - For Clamp	1
1DP-24	3442	*Washer	1
1DP-25	3479	*Nut	1
1DP-26	22684	*Plate - Extension	1
1DP-27	3311	*Bolt - Tee	1
1DP-28A	------	Pipe - 1/2" P.S. x 2" lg.	1
1DP-29	24800	Elbow - 1/2"	1
1DP-30A	203424	Nipple	1
1DP-31	3378	Screw	4
1DP-32A	131046	Pump - Coolant	1
1DP-33A	57483	Elbow - 1-1/4"	1
1DP-34A	------	Pipe - 1-1/4" P.S. x 5-1/2" lg.	1
1DP-35	159954	Support - Pipe	1
1DP-40A	191628	Baffle - Coolant Tank	1
1DP-41A	191626	Tank - Coolant	1
1DP-42B	289441	Nipple - Hose	1
1DP-43A	237001	Clamp - Hose	2
1DP-44A	191629	Hose - Drain	1
1DP-55	191627	Cover - Coolant Tank	1
1DP-56	2123	Washer	4
1DP-57	3472	Nut	4
1DP-58	211228	Valve - Check	1
1DP-60	309444	**Valve - Mist Coolant	1
1DP-61	289139	**Fitting - Hose, Coolant	1
1DP-62	273960	**Bushing - Reducing	1

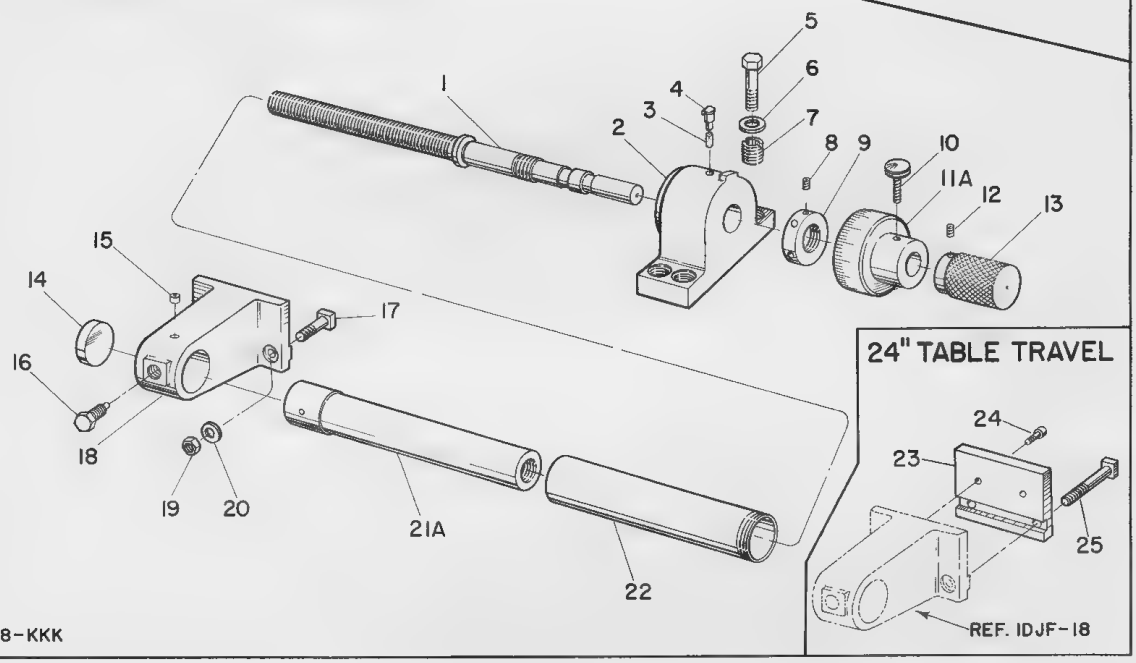
*Flood Type
**Mist Type

WORK BLADE GRINDING ATTACHMENT



29 KKK

MICROMETER TABLE POSITIONING ATTACHMENT



148-KKK

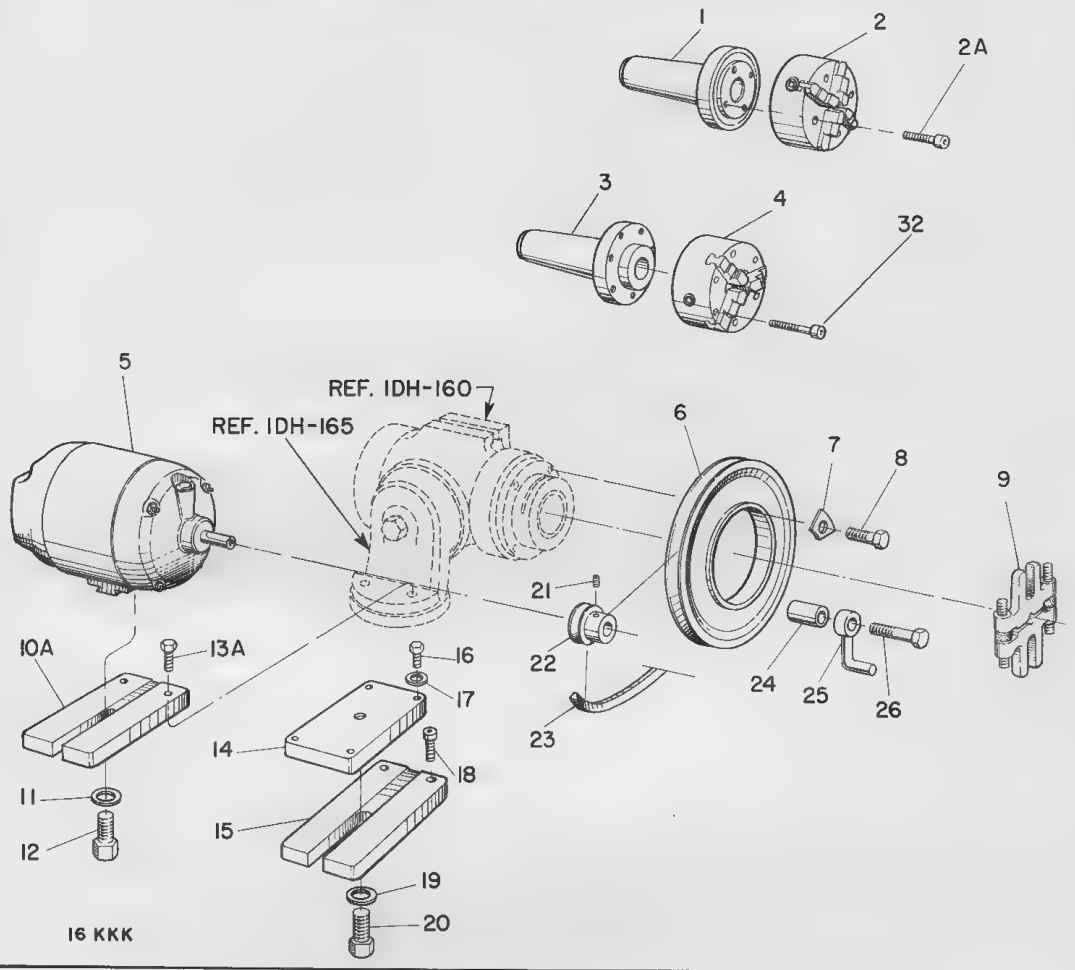
WORK BLADE GRINDING ATTACHMENT – UNIT 1DBW

KEY NO.	PART NO.	PART NAME	AMT. USED	KEY NO.	PART NO.	PART NAME	AMT. USED
1DBW-1	62999	Screw - Adjusting	3	1DBW-12	3544	Pin	2
1DBW-2	107503	Holder - Blade	1	1DBW-13	63002	Dial	1
1DBW-3	44980	Oiler - 5/16"	2	1DBW-14	63001	Block - Clamping	1
1DBW-4	107502	Body - Blade Grinding	1	1DBW-15	63000	Stud	1
1DBW-5	3479	Nut	2	1DBW-18	3315	Bolt - Tee	2
1DBW-7	62998	Bushing	1	1DBW-19	63006	Tongue	2
1DBW-8	3555	Plug	1	1DBW-20	3486	Screw	2
1DBW-9	3498	Screw	1	1DBW-21	159914	Screw - 24" Table	2
1DBW-10	3559	Plug	1	1DBW-22	159913	Clamp - Workhead, 24" Table	2
1DBW-11	3479	Nut	1				

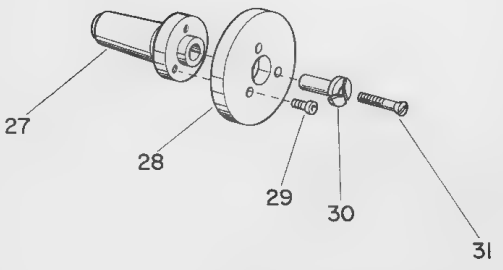
MICROMETER TABLE POSITIONING ATTACHMENT – UNIT 1DJF

KEY NO.	PART NO.	PART NAME	AMT. USED	KEY NO.	PART NO.	PART NAME	AMT. USED
1DJF-1		Screw - Lead		1DJF-14	193357	Plug	1
	120714	Inch System	1	1DJF-15	69583	Oiler - 5/16"	1
	158545	Metric	1	1DJF-16	143741	Screw	1
1DJF-2	120715	Bracket - Screw	1	1DJF-17	3314	Bolt - Tee	2
1DJF-3	1936	Plug - Felt	1	1DJF-18	193354	Bracket - Nut	1
1DJF-4	44980	Oiler - 5/16"	1	1DJF-19	3478	Nut	2
1DJF-5	1062	Screw	4	1DJF-20	3441	Washer	2
1DJF-6	120717	Washer	4	1DJF-21		Nut - Leadscrew	
1DJF-7	120716	Bushing - Adjusting	4		193355	Inch System	1
1DJF-8	1911	Screw	1		193356	Metric	1
1DJF-9	4184	Nut - Lock	1	1DJF-22	134513	Tubing - Telescopic	1
1DJF-10	2253	Screw - Thumb	1				
1DJF-11A		Dial - Leadscrew				24" TABLE TRAVEL ONLY	
	134512	Inch System	1				
	158547	Metric	1	1DJF-23	170782	Plate - Raising	1
1DJF-12	2332	Screw	1	1DJF-24	3396	Screw	2
1DJF-13	120713	Knob - On Screw	1	1DJF-25	109425	Bolt - Tee	2

CYLINDRICAL GRINDING ATTACHMENT

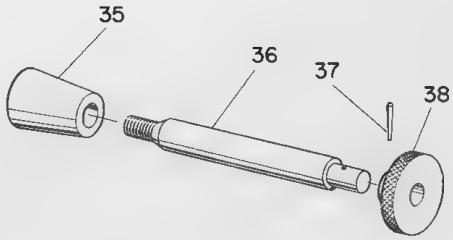


SAW GRINDING ATTACHMENT



DRAW IN BOLT

50 – 40 N.S.



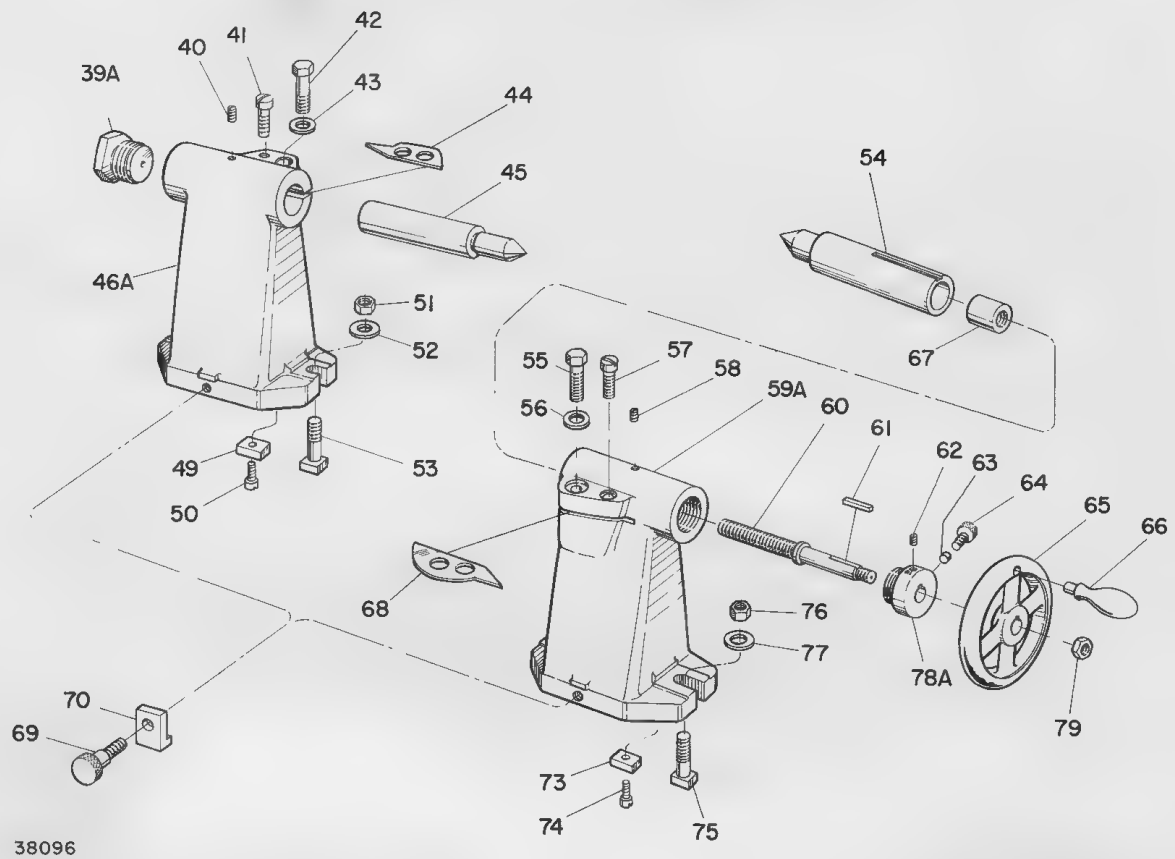
CYLINDRICAL GRINDING ATTACHMENT – UNIT 1 DBT

KEY NO.	PART NO.	PART NAME	AMT. USED
1DBT-1		Flange - 4" For 4 Jaw Chuck	
	160040	#12 B & S Taper	1
	160039	#5 Morse Taper	1
1DBT-2	160038	Chuck - 4" - 4 Jaw	1
1DBT-2A	2324	Screw	4
1DBT-3		Flange - For 3 Jaw Chuck (Standard)	
	157770	#12 B & S Taper	1
	157769	#5 Morse Taper	1
1DBT-4	157768	Chuck - 4" - 3 Jaw (Standard)	1
1DM-5	100811	Motor - Workhead, 1/4 HP, 1800/1500 RPM, 50/60 Cycle	1
1DBT-6	107469	Pulley - Workhead	1
1DBT-7	62455	Clamp - Workhead Pulley	2
1DBT-8	2103	Screw	2
1DBT-9	26147	Dog - Balance	1
1DBT-10A	184679	Plate - Motor (56 Frame Motor)	1
1DBT-11	3442	Washer	1
1DBT-12	849	Screw	1
1DBT-13A	1879	Screw	2
1DBT-14	157064	Plate - Motor (48 Frame Motor)	1
1DBT-15	157065	Plate - Motor Support (48 Frame Motor)	1
1DBT-16	103317	Screw	4
1DBT-17	2196	Washer - Lock	4
1DBT-18	3266	Screw	2
1DBT-19	3442	Washer	1
1DBT-20	849	Screw	1
1DBT-21		Screw	
	2282	Standard - For 1/2" Hole Pulley	1
	1879	For 5/8" Hole Grooved Pulley	1
1DBT-22		Pulley - Motor	
	64836	Standard - 1/2" Hole	1
	109996	Grooved - 5/8" Hole	1
1DBT-23	62489	Belt - Workhead, Driving	1
1DBT-24	62462	Spacer - Carrier Dog	1
1DBT-25	7494	Dog - Carrier	1
1DBT-26	3464	Screw	1
1DBT-27		Stem - Saw Grinding Attachment	
	38910	#12 B & S Taper	1
	96790	#5 Morse Taper	1
1DBT-28	38911	Plate - Saw Grinding	1
1DBT-29	12	Screw	3
1DBT-30	7368	Bushing - Saw Grinding	1
1DBT-31	310	Screw	1
1DBT-32	2321	Screw	6

DRAW-IN BOLT FOR COLLETS – UNIT 1 DJF

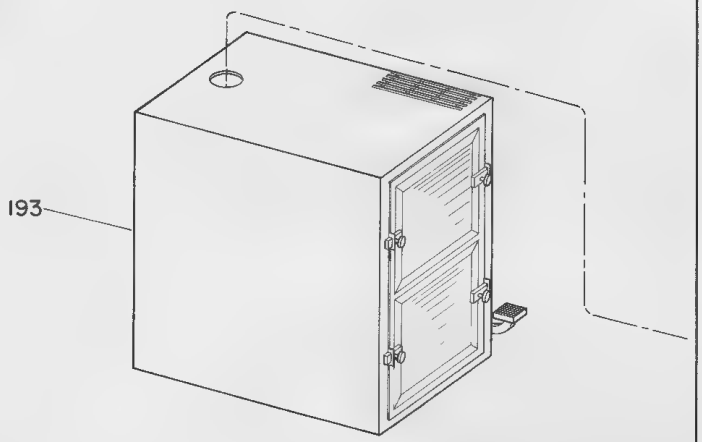
KEY NO.	PART NO.	PART NAME	AMT. USED
1DJF-35	139693	Collet - 50 to 40 N.S.	1
1DJF-36	139694	Bolt - Draw In, For 50 to 40 N.S.	1
1DJF-37	642	Pin	1
1DJF-38	62462	Knob - Draw In Bolt, For 50 to 40 N.S.	1

HEAVY DUTY TAILSTOCK



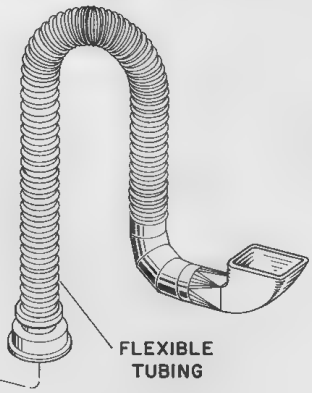
38096

DUST EXHAUST



318248
318249

ACCESSORIES



HEAVY DUTY TAILSTOCK ATTACHMENT – UNIT 1 DJF

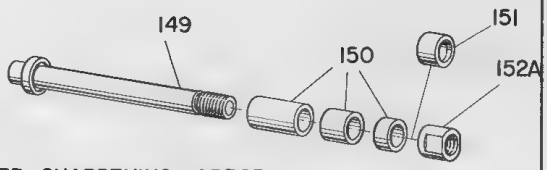
KEY NO.	PART NO.	PART NAME	AMT. USED	KEY NO.	PART NO.	PART NAME	AMT. USED
1DJF-39A	305209	Cap - Tailstock, Left Hand	1	1DJF-60	20468	Screw - Spindle	1
1DJF-40	216	Screw	1	1DJF-61	864	Key	1
1DJF-41	1278	Screw	1	1DJF-62	1205	Screw	1
1DJF-42	635	Screw	1	1DJF-63	2008	Plug	1
1DJF-43	1035	Washer	1	1DJF-64	3193	Screw - Thumb	1
1DJF-44	37694	Packing	1	1DJF-65	20467	Handwheel	1
1DJF-45	135963	Spindle - Tailstock, Left Hand	1	1DJF-66	6809	Handle	1
1DJF-46A	305331	Body - Tailstock, Left Hand, Dead Center	1	1DJF-67	8115	Nut - Spindle	1
				1DJF-68	37694	Packing	1
1DJF-49	3312	Tongue	2	1DJF-69	159914	Screw	2
1DJF-50	3486	Screw	2	1DJF-70	159913	Clamp - Workhead	2
1DJF-51	3479	Nut	2	1DJF-73	3312	Tongue	2
1DJF-52	3442	Washer	2	1DJF-74	3486	Screw	2
1DJF-53	3274	Bolt - Tee	2	1DJF-75	3274	Bolt - Tee	2
1DJF-54	8118	Spindle - Tailstock, Right Hand	1	1DJF-76	3479	Nut	2
1DJF-55	635	Screw	1	1DJF-77	3442	Washer	2
1DJF-56	1035	Washer	1	1DJF-78A	305208	Cap - Tailstock, Right Hand	1
1DJF-57	1278	Screw	1	1DJF-79	153	Nut	1
1DJF-58	216	Screw	1				
1DJF-59A	305331	Body - Tailstock, Right Hand, Adjusting Center	1				

EXHAUST DUST ATTACHMENT – UNIT 1 DJF

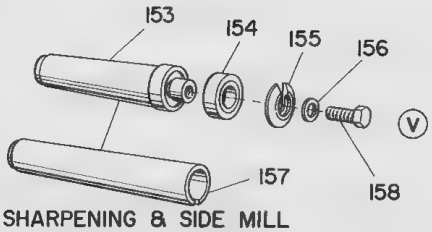
KEY NO.	PART NO.	PART NAME	AMT. USED
*1DJF-193	181962	Dust - Collector	1

*318248 Model 64 - 3/4 hp
318249 Model 66 - 1/2 hp

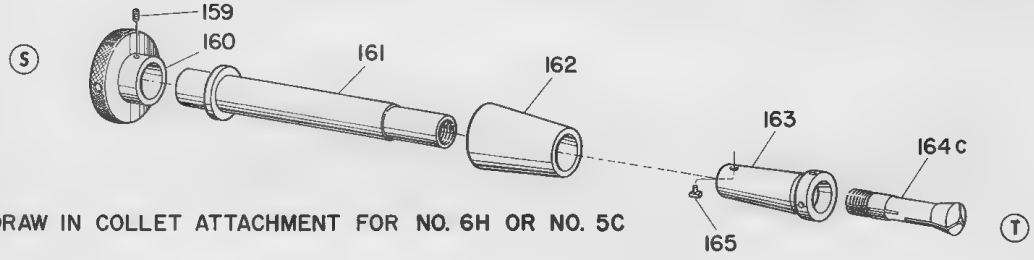
ATTACHMENTS



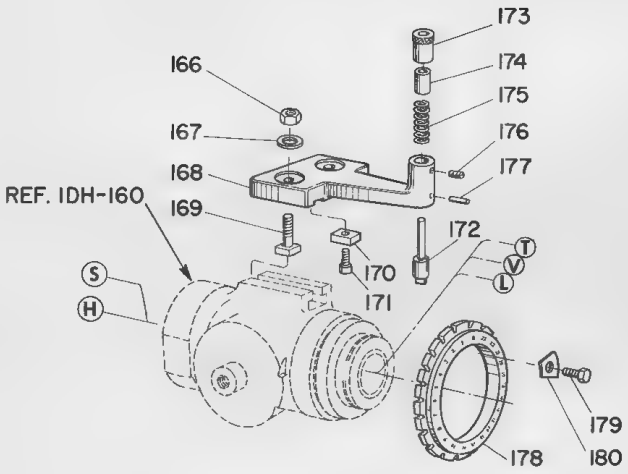
CUTTER SHARPENING ARBOR



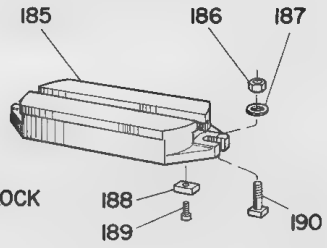
SAW SHARPENING & SIDE MILL



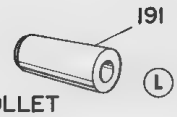
DRAW IN COLLET ATTACHMENT FOR NO. 6H OR NO. 5C



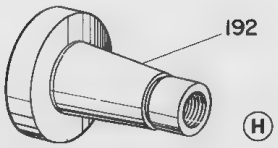
24 SLOT INDEXING ATTACHMENT



2" RAISING BLOCK



REDUCING COLLET



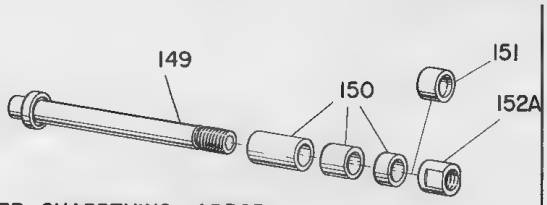
FACE MILL ADAPTER

ATTACHMENTS (Miscellaneous) – UNIT 1 DJF

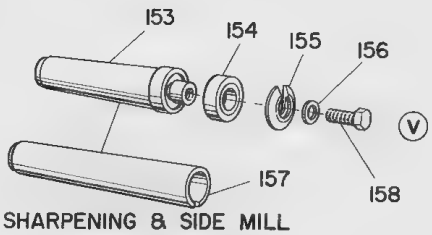
KEY NO.	PART NO.	PART NAME	AMT. USED
1DJF-149		Arbor - Cutter Sharpening	
	134519	7/8" Diameter x 8-3/16" Long	1
	134520	1" Diameter x 8-3/16" Long	1
	134521	1-1/4" Diameter x 8-3/4" Long	1
	134522	1-1 2" Diameter x 8-3/4" Long	1
	134523	2" Diameter x 8-3/4" Long	1
1DJF-150		Collar - Spacing, For 7/8" Diameter Arbor	
	3646	2" Long	3
	3645	1" Long	2
	3644	1/2" Long	1
		Collar - Spacing, For 1" Diameter Arbor	
	3649	2" Long	3
	3648	1" Long	2
	3647	1/2" Long	1
		Collar - Spacing, For 1-1/4" Diameter Arbor	
	3653	2" Long	3
	3652	1" Long	2
	3651	1/2" Long	1
		Collar - Spacing, For 1-1/2" Diameter Arbor	
	3657	2" Long	3
	3656	1" Long	2
	3655	1/2" Long	1
		Collar - Spacing, For 2" Diameter Arbor	
	3661	2" Long	3
	3660	1" Long	2
	3659	1/2" Long	1
1DJF-151		Collar - Front	
	3677	For 1-1/4" Diameter Arbor	1
	3678	For 1-1/2" Diameter Arbor	1
	3679	For 2" Diameter Arbor	1
1DJF-152A		Nut - Arbor	
	1341	For 7/8" Diameter Arbor	1
	3693	For 1" Diameter Arbor	1
	3693	For 1-1/4" Diameter Arbor	1
	3694	For 1-1/2" Diameter Arbor	1
	3694	For 2" Diameter Arbor	1
1DJF-153		Stem - For Sharpening Saw	
	66801	#12 B & S Taper	1
	96791	#5 Morse Taper	1
1DJF-154	66800	Collar - For Saw	1
1DJF-155	66799	Collar - For Clamp Saw	1
1DJF-156	3441	Washer	1
1DJF-157	16033	Collet - On Collar	1
1DJF-158	49	Screw	1
*1DJF-159	1879	Screw	1
1DJF-160	139877	Wheel - Hand	1
1DJF-161	139876	Bar - Draw In (For #6 H)	1
	165270	Bar - Draw In (For #5 C Collets	1
1DJF-162	139878	Sleeve - Centering	1
1DJF-163		Collet - Adapter	
	139880	#12 B & S Taper (For #6 H)	1
	139881	#5 Morse Taper (For #6 H)	1
	165272	#12 B & S Taper (For #5C)	1
	165271	#5 Morse Taper (For #5C)	1
1DJF-164C		Collet - #6 H)	
	186646-8	1/8" Hole	1
	186646-9	9/64" Hole	1
	186646-10	5/32" Hole	1
	186646-11	11/64" Hole	1
	186646-12	3/16" Hole	1
	186646-13	13/64" Hole	1
	186646-14	7/32" Hole	1
	186646-15	15/64" Hole	1
	186646-16	1/4" Hole	1
	186646-17	17/64" Hole	1
	186646-18	9, 32" Hole	1
	186646-19	19/64" Hole	1
	186646-20	5/16" Hole	1
	186646-21	21/64" Hole	1
	186646-22	11/32" Hole	1
	186646-23	23/64" Hole	1
	186646-24	3/8" Hole	1
	186646-25	25/64" Hole	1
	186646-26	13/32" Hole	1
	186646-27	27/64" Hole	1
	186646-28	7/16" Hole	1
	186646-29	29/64" Hole	1
	186646-30	15/32" Hole	1
	186646-31	31/64" Hole	1
	186646-32	1/2" Hole	1
	186646-33	33/64" Hole	1
	186646-34	17/32" Hole	1
	186646-35	35/64" Hole	1
	186646-36	9/16" Hole	1
	186646-37	37/64" Hole	1
	186646-38	19/32" Hole	1
	186646-39	39/64" Hole	1
	186646-40	5/8" Hole	1
	186646-41	41/64" Hole	1
	186646-42	21/32" Hole	1
	186646-43	43/64" Hole	1
	186646-44	11/16" Hole	1
	186646-45	45/64" Hole	1
	186646-46	23/32" Hole	1
	186646-47	47/64" Hole	1
	186646-48	3/4" Hole	1
	186646-49	49/64" Hole	1
	186646-50	25/32" Hole	1
	186646-51	51/64" Hole	1
	186646-52	13/16" Hole	1
	186646-53	53/64" Hole	1
	186646-54	27/32" Hole	1
	186646-55	55/64" Hole	1
	186646-56	7/8" Hole	1
	186646-57	57/64" Hole	1
	186646-58	29/32" Hole	1
	186646-59	59/64" Hole	1
	186646-60	15/16" Hole	1
	186646-61	61/64" Hole	1
	186646-62	31/32" Hole	1
	186646-63	63/64" Hole	1
	186646-64	1" Hole	1
	186646-65	1-1/64" Hole	1
	186646-66	1-1/32" Hole	1
	186646-67	1-3/64" Hole	1
	186646-68	1-1/16" Hole	1
	186646-69	1-5/64" Hole	1
	186646-70	1-3/32" Hole	1
	186646-71	1-7/64" Hole	1
	186646-72	1-1/8" Hole	1

NOTE: Key numbers 159 through 165 may be ordered as Chuck Adapter Assembly No. 65KKK. Specify collets desired (6 H or 5 C).

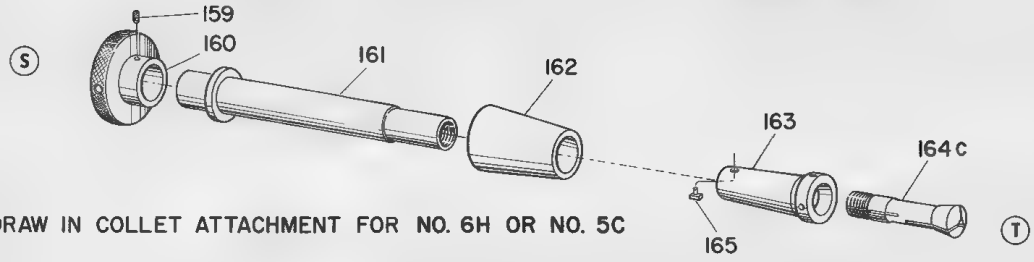
ATTACHMENTS



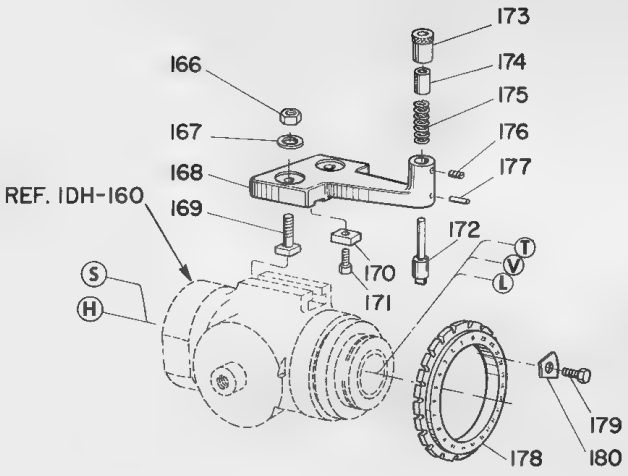
CUTTER SHARPENING ARBOR



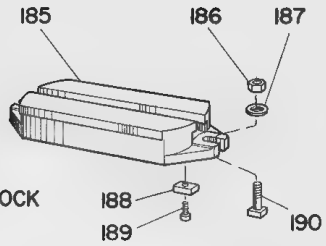
SAW SHARPENING & SIDE MILL



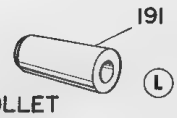
DRAW IN COLLET ATTACHMENT FOR NO. 6H OR NO. 5C



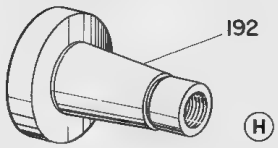
24 SLOT INDEXING ATTACHMENT



2" RAISING BLOCK



REDUCING COLLET



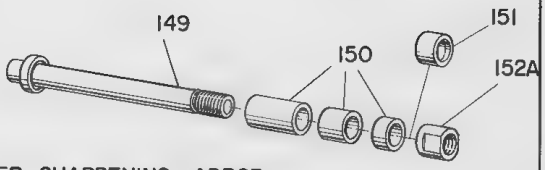
FACE MILL ADAPTER

ATTACHMENTS (Miscellaneous) – UNIT 1 DJF

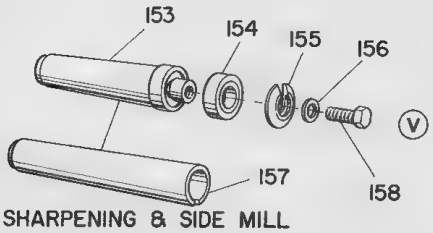
KEY NO.	PART NO.	PART NAME	AMT. USED
1DJF-164C (Cont.)		Collet - Spring, #5C	
	186647-8	1/8" Hole	1
	186647-9	9/64" Hole	1
	186647-10	5/32" Hole	1
	186647-11	11/64" Hole	1
	186647-12	3/16" Hole	1
	186647-13	13/64" Hole	1
	186647-14	7/32" Hole	1
	186647-15	15/64" Hole	1
	186647-16	1/4" Hole	1
	186647-17	17/64" Hole	1
	186647-18	9/32" Hole	1
	186647-19	19/64" Hole	1
	186647-20	5/16" Hole	1
	186647-21	21/64" Hole	1
	186647-22	11/32" Hole	1
	186647-23	23/64" Hole	1
	186647-24	3/8" Hole	1
	186647-25	25/64" Hole	1
	186647-26	13/32" Hole	1
	186647-27	27/64" Hole	1
	186647-28	7/16" Hole	1
	186647-29	29/64" Hole	1
	186647-30	15/32" Hole	1
	186647-31	31/64" Hole	1
	186647-32	1/2" Hole	1
	186647-33	33/64" Hole	1
	186647-34	17/32" Hole	1
	186647-35	35/64" Hole	1
	186647-36	9/16" Hole	1
	186647-37	37/64" Hole	1
	186647-38	19/32" Hole	1
	186647-39	39/64" Hole	1
	186647-40	5/8" Hole	1
	186647-41	41/64" Hole	1
	186647-42	21/32" Hole	1
	186647-43	43/64" Hole	1
	186647-44	11/16" Hole	1
	186647-45	45/64" Hole	1
	186647-46	23/32" Hole	1
	186647-47	47/64" Hole	1
	186647-48	3/4" Hole	1
	186647-49	49/64" Hole	1
	186647-50	25/32" Hole	1
	186647-51	51/64" Hole	1
	186647-52	13/64" Hole	1
	186647-53	53/64" Hole	1
	186647-54	27/32" Hole	1
	186647-55	55/64" Hole	1
	186647-56	7/8" Hole	1
	186647-57	57/64" Hole	1
	186647-58	29/32" Hole	1
	186647-59	59/64" Hole	1
	186647-60	15/16" Hole	1
	186647-61	61/64" Hole	1
	186647-62	31/32" Hole	1
	186647-63	63/64" Hole	1
	186647-64	1" Hole	1
1DJF-165		Key - In Collet	
	139879	#6 H	1
	165273	#5C	1

*NOTE: Key numbers 159 through 165 may be ordered as Chuck Adapter Assembly No. 65KKK. Specify collets desired (6H or 5C).

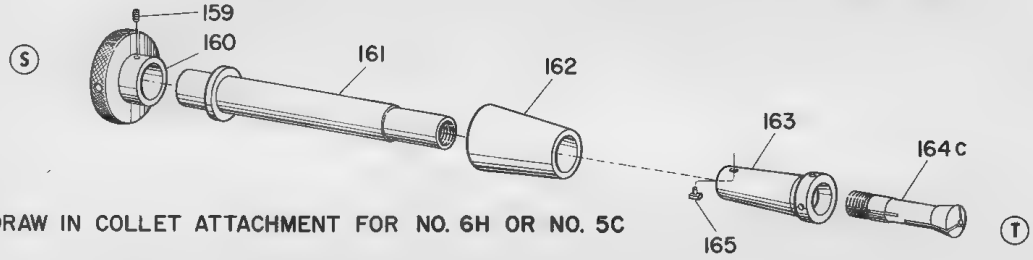
ATTACHMENTS



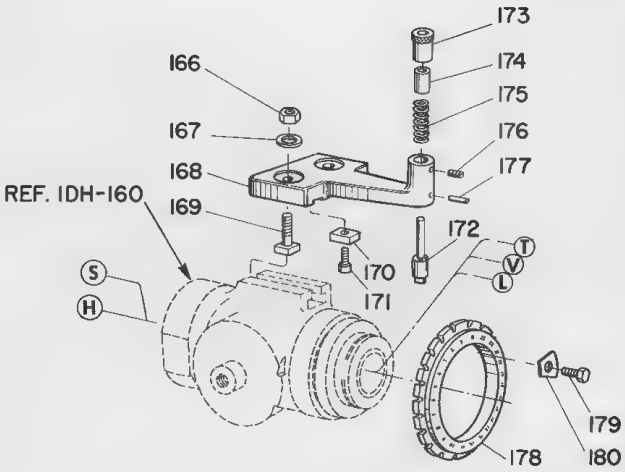
CUTTER SHARPENING ARBOR



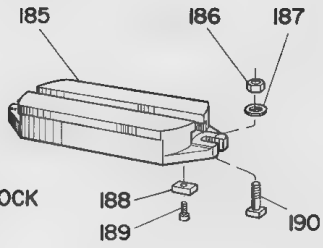
SAW SHARPENING & SIDE MILL



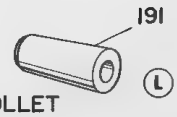
DRAW IN COLLET ATTACHMENT FOR NO. 6H OR NO. 5C



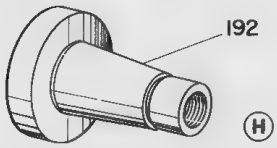
24 SLOT INDEXING ATTACHMENT



2" RAISING BLOCK



REDUCING COLLET

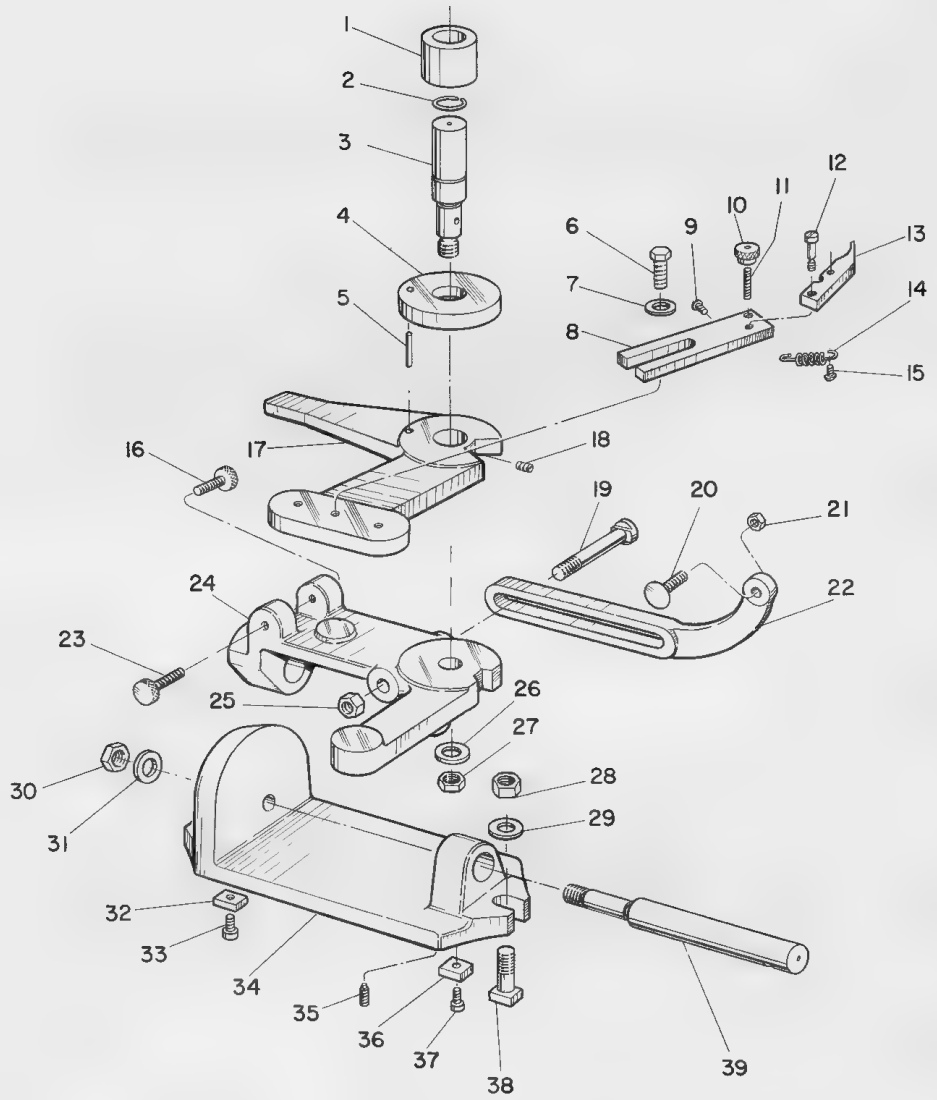


FACE MILL ADAPTER

ATTACHMENTS (Miscellaneous) – UNIT 1 DJF

KEY NO.	PART NO.	PART NAME	AMT. USED
1DJF-166	3479	Nut	1
1DJF-167	3442	Washer	1
1DJF-168	120203	Bracket - Index Pin	1
1DJF-169	3274	Bolt - Tee	1
1DJF-170	3312	Tongue	2
1DJF-171	3486	Screw	2
1DJF-172	103126	Pin - Index Lock	1
1DJF-173	103129	Knob - Index Pin	1
1DJF-174	103127	Bushing - Index Lock	1
1DJF-175	253	Spring	1
1DJF-176	2341	Screw - Set, In Index Bracket	1
1DJF-177	2160	Pin	1
1DJF-178	133647	Plate - Index 24 Slots	1
1DJF-179	2103	Screw	1
1DJF-180	62455	Clamp - Workhead	1
1DJF-185	68663	Block - Raising 2"	1
1DJF-186	3479	Nut	2
1DJF-187	3442	Washer	2
1DJF-188	3312	Tongue	2
1DJF-189	3486	Screw	2
1DJF-190	3311	Bolt - Tee	2
1DJF-191		Collet - Reducing	
	139690	#12 B & S to #1 Morse	1
	139691	#12 B & S to #2 Morse	1
	139692	#12 B & S to #3 Morse	1
	68562	#12 B & S to #4 Morse	1
	146029	#12 B & S to #4 B & S	1
	146030	#12 B & S to #5 B & S	1
	146031	#12 B & S to #6 B & S	1
	146032	#12 B & S to #8 B & S	1
	16033	#12 B & S to #11 B & S	1
	146033	#5 Morse to #1 Morse	1
	146034	#5 Morse to #4 B & S	1
	146035	#5 Morse to #5 B & S	1
	146036	#5 Morse to #6 B & S	1
	146037	#5 Morse to #7 B & S	1
	146038	#5 Morse to #8 B & S	1
	146039	#5 Morse to #9 B & S	1
	146040	#5 Morse to #10 B & S	1
	146041	#5 Morse to #11 B & S	1
1DJF-192	117312	Adapter - Face Mill	1

GEAR CUTTER SHARPENING ATTACHMENT

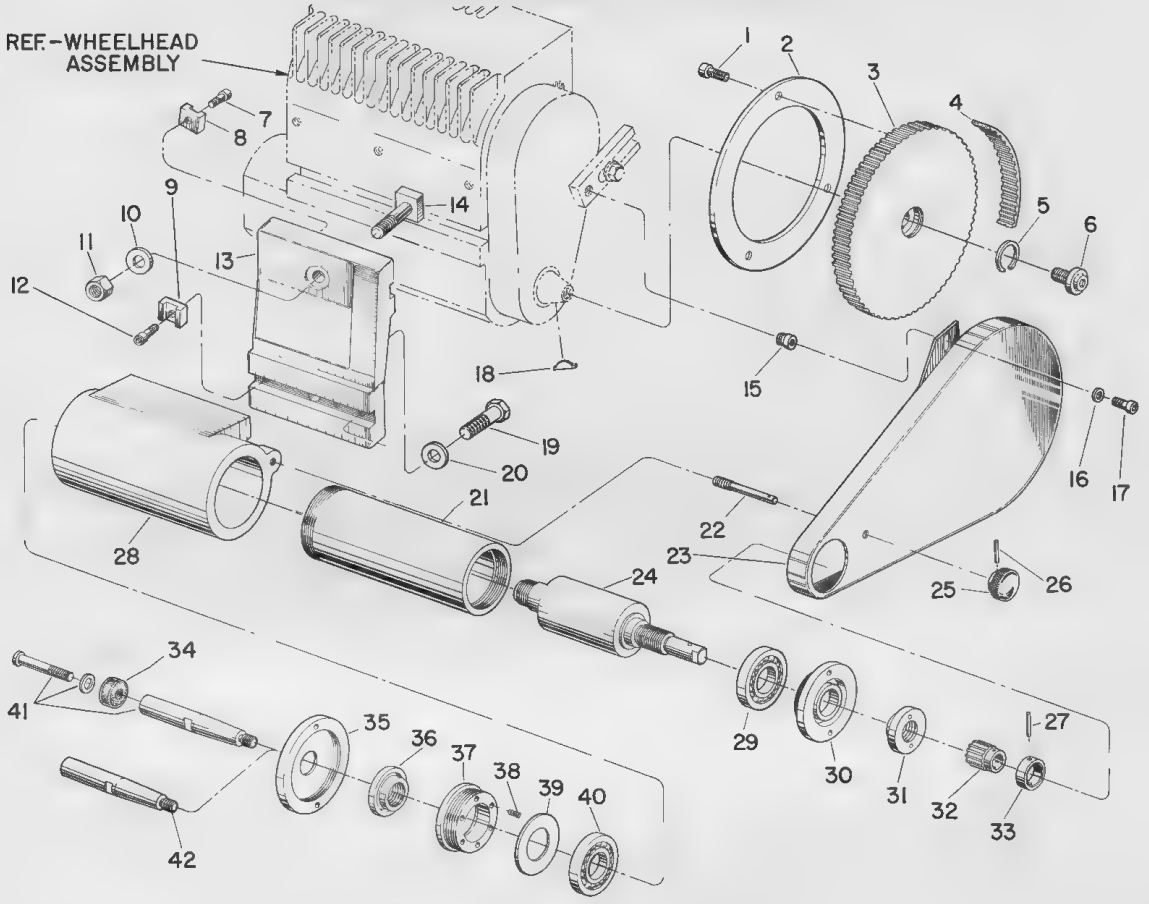


26KKK

GEAR CUTTER SHARPENING ATTACHMENTS – UNIT 1 DBV

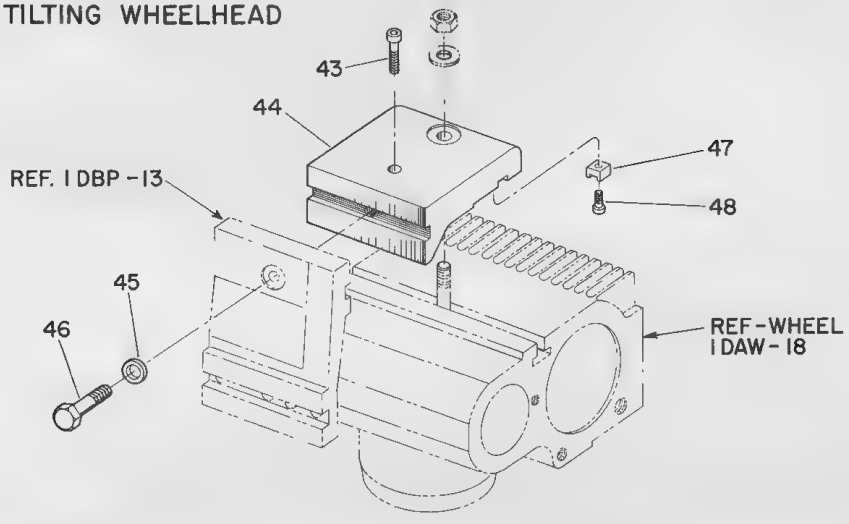
KEY NO.	PART NO.	PART NAME	AMT. USED
1DBV-1		Bushing - Cutter	
	62513	2" Diameter, English	1
	62512	1-3/4" Diameter, English	1
	62511	1-1/2" Diameter, English	1
	62510	1-1/4" Diameter, English	1
	62509	1" Diameter, English	1
	147973	50mm Diameter, Metric	1
	62518	45mm Diameter, Metric	1
	62517	40mm Diameter, Metric	1
	62516	32mm Diameter, Metric	1
	62515	27mm Diameter, Metric	1
1DBV-2	71090	Ring - Spring Locking	1
1DBV-3		Stud - Cutter	
	62507	7/8" Diameter, English	1
	62514	25mm Diameter, Metric	1
1DBV-4	64958	Collar - Cutter, Stud	1
1DBV-5	3542	Pin	1
1DBV-6	641	Screw	1
1DBV-7	3441	Washer	1
1DBV-8	67496	Holder - Pawl	1
1DBV-9	3459	Screw	1
1DBV-10	67495	Knob - Holder Stud	1
1DBV-11	67494	Stud - Holder	1
1DBV-12	62521	Screw - Fillister Head	1
1DBV-13	67497	Pawl	1
1DBV-14	251	Spring	1
1DBV-15	3459	Screw	1
1DBV-16	62522	Screw - Thumb Adjusting	1
1DBV-17	62540	Plate - Cutter Supporting	1
1DBV-18	1879	Screw	1
1DBV-19	64960	Bolt - Centering Cage	1
1DBV-20	66796	Pin - Centering Gage	1
1DBV-21	664	Nut	1
1DBV-22	120005	Bracket - Centering Gage	1
1DBV-23	62522	Screw - Thumb Adjusting	1
1DBV-24	64957	Bracket - Center	1
1DBV-25	3479	Nut	1
1DBV-26	3442	Washer	1
1DBV-27	3474	Nut	1
1DBV-28	3479	Nut	2
1DBV-29	3442	Washer	2
1DBV-30	506	Nut	1
1DBV-31	888	Washer	1
1DBV-32	3312	Tongue	1
1DBV-33	3486	Screw	1
1DBV-34	62560	Base - Gear Cutter Grinder	1
1DBV-35	3454	Screw	1
1DBV-36	3312	Tongue	1
1DBV-37	3486	Screw	1
1DBV-38	3311	Bolt - Tee	2
1DBV-39	118448	Shaft - Rocker	1

INTERNAL GRINDING ATTACHMENT



119 KKK

WITHOUT TILTING WHEELHEAD



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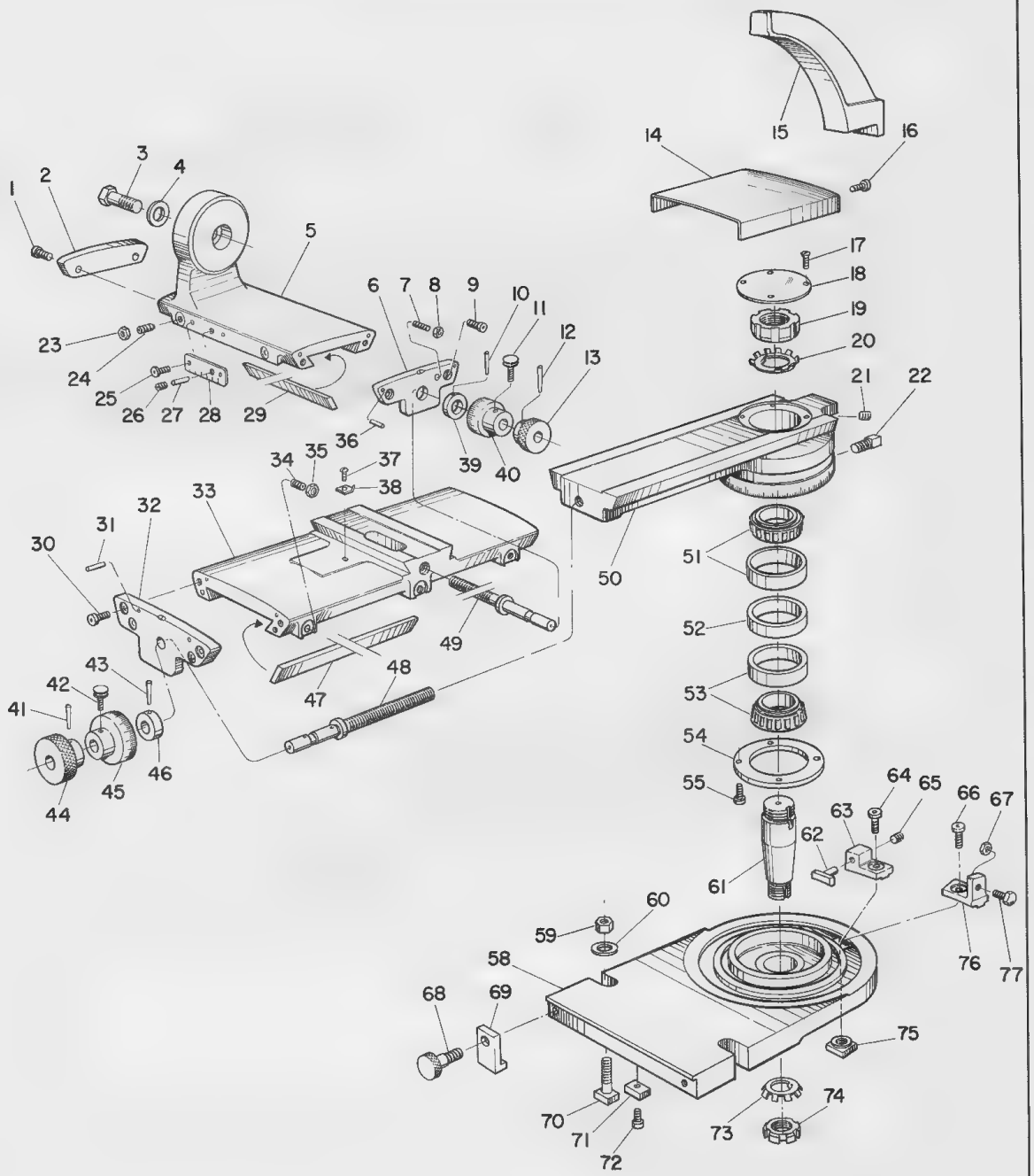
INTERNAL GRINDING ATTACHMENT – UNIT 1 DBP

KEY NO.	PART NO.	PART NAME	AMT. USED
1DBP-1	3199	Screw - Cap	3
1DBP-2	148465	Flange - Driver	1
1DBP-3	148464	Pulley - Driver	1
1DBP-4	186583	Belt - Timing	1
1DBP-5	188711	Ring - Retaining	1
1DBP-6	143627	Screw	1
1DBP-7	3218	Screw - Cap	2
1DBP-8	3312	Tongue	2
1DBP-9	3312	Tongue	2
1DBP-10	3442	Washer	1
1DBP-11	3479	Nut - Hex	1
1DBP-12	3218	Screw - Cap	2
1DBP-13	170506	Bracket - Support	1
1DBP-14	3311	Bolt - Tee	1
1DBP-15		Spacer - Belt Guard	
	189643	Front	1
	189644	Rear (Shown)	1
1DBP-16	936	Washer	1
1DBP-17	3396	Screw - Cap	1
1DBP-18	3279	Key	1
1DBP-19	3463	Screw - Hex Head	1
1DBP-20	3442	Washer	1
1DBP-21	148472	Sleeve - Spindle	1
1DBP-22	143622	Stud - Cover	1
1DBP-23	173020	Guard - Belt	1
1DBP-24	150042	Spindle	1
1DBP-25	126873	Knob	1
1DBP-26	140	Pin - Taper	1

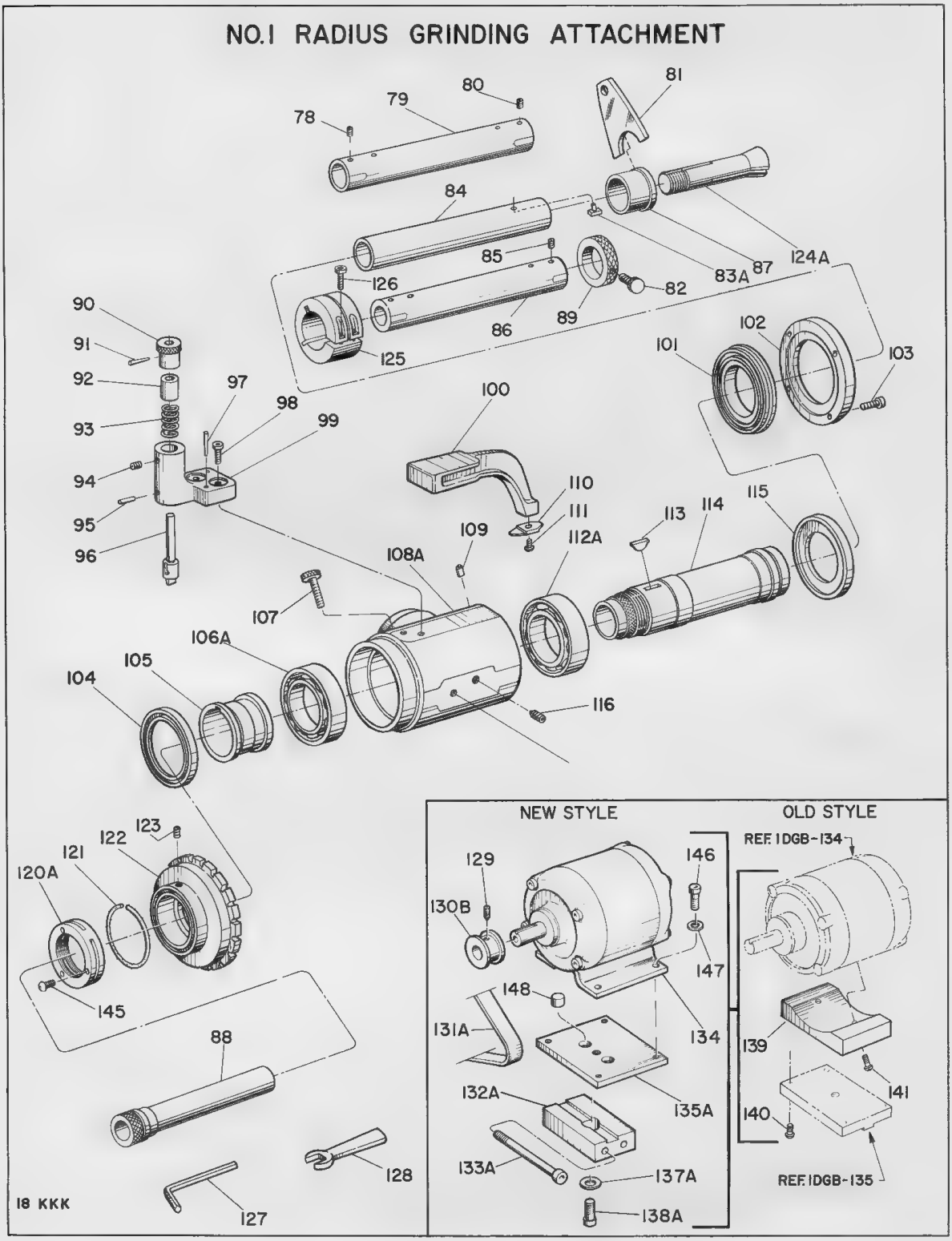
KEY NO.	PART NO.	PART NAME	AMT. USED
1DBP-27	148454	Pin	1
1DBP-28	170505	Body	1
1DBP-29	148457	Bearing - Ball	1
1DBP-30	148520	Nut - Retainer	1
1DBP-31	148519	Nut - Retainer	1
1DBP-32	148453	Pulley - Driven	1
1DBP-33	148452	Flange - Driven	1
1DBP-34		Wheel - Grinding	
	158178	5/8 x 1/2 x 1/4 Hole - Straight, B/P1Y	1
	158179	3/4 x 1/2 x 1/4 Hole - Straight, B/P1Y	1
	158180	1 x 1/2 x 1/4 Hole - Straight, B/P1Y	1
1DBP-35	148456	Cap - Dust	1
1DBP-36	148461	Nut - Retainer	1
1DBP-37	148610	Nut - Retainer, Outer	1
1DBP-38	156134	Spring - Loading	6
1DBP-39	148609	Ring - Loading	1
1DBP-40	148457	Bearing - Ball	1
1DBP-41	148463	Quill - Type 1, 3/8 Hole	1
1DBP-42	158177	Quill - Type 2, 1/4 Hole	1
1DBP-43	3397	Screw - Cap	1
1DBP-44	189879	Bracket - Adapter	1
1DBP-45	3442	Washer	1
1DBP-46	3463	Screw - Hex Head	1
1DBP-47	3312	Tongue	2
1DBP-48	3218	Screw - Cap	2

NO.1 RADIUS GRINDING ATTACHMENT



RADIUS GRINDING ATTACHMENT – NO. 1 – UNIT 1 DGB

KEY NO.	PART NO.	PART NAME	AMT. USED
1DGB-1	3203	Screw	2
1DGB-2	103108	Cover - Workhead Support	1
1DGB-3	183	Screw	1
1DGB-4	1040	Washer	1
1DGB-5	112570	Support - Workhead	1
1DGB-6	103109	Apron - Workhead Support	1
1DGB-7	3231	Screw	1
1DGB-8	3472	Nut	1
1DGB-9	3204	Screw	2
1DGB-10	2291	Pin	1
1DGB-11	3196	Screw - Thumb	1
1DGB-12	2291	Pin	1
1DGB-13	103115	Knob - Cross	1
1DGB-14	103140	Cover	1
1DGB-15	109190	Gage - Setting	1
1DGB-16	70198	Screw	2
1DGB-17	2281	Screw	4
1DGB-18	109183	Cover - Swivel	1
1DGB-19	105139	Nut - Lock	1
1DGB-20	3791	Washer - Lock	1
1DGB-21	62733	Plug - 1/8"	1
1DGB-22	103098	Pin - Stop	1
1DGB-23	3472	Nut	2
1DGB-24	3231	Screw	2
1DGB-25	2285	Screw	2
1DGB-26	2333	Screw	1
1DGB-27	109185	Shoe - Locking	1
1DGB-28		Scale - Cross	
	112568	Inch System	1
	112569	Metric	1
1DGB-29	112567	Gib - Support	1
1DGB-30	3204	Screw	4
1DGB-31	3270	Pin	2
1DGB-32	103100	Apron - On Slide	1
1DGB-33	103099	Slide	1
1DGB-34	3231	Screw	3
1DGB-35	3472	Nut	3
1DGB-36	3270	Pin	2
1DGB-37	2285	Screw	1
1DGB-38	103139	Pointer	1
1DGB-39	103103	Collar - Screw	1
1DGB-40		Dial - Cross Screw	
	103114	Inch System	1
	115107	Metric	1
1DGB-41	2291	Pin	1
1DGB-42	2253	Screw - Thumb	1
1DGB-43	2291	Pin	1
1DGB-44	103106	Knob - Longitudinal Screw	1
1DGB-45		Dial - Longitudinal Screw	
	103105	Inch System	1
	115108	Metric	1
1DGB-46	103103	Collar - Screw	1
1DGB-47	103101	Gib - Slide	1
1DGB-48	103102	Screw - Longitudinal	1
1DGB-49	112566	Screw - Cross	1
1DGB-50	103097	Swivel	1
1DGB-51	206058	Bearing - Roller	1
1DGB-52	103096	Spacer	1
1DGB-53	206058	Bearing - Roller	1
1DGB-54	109184	Retainer - Bearing	1
1DGB-55	3203	Screw	4
1DGB-58	106730	Base	1
1DGB-59	3479	Nut	2
1DGB-60	3442	Washer	2
1DGB-61	106731	Stud - In Base	1
1DGB-62	103134	Shoe - Swivel Clamp	1
1DGB-63	103133	Clamp - Swivel	1
1DGB-64	103135	Screw - For Dog	1
1DGB-65	2282	Screw	1
1DGB-66	103135	Screw - For Dpg	2
1DGB-67	3472	Nut	2
1DGB-68	159914	Screw	2
1DGB-69	159913	Clamp	2
1DGB-70	3274	Bolt - Tee	2
1DGB-71	3312	Tongue	2
1DGB-72	3486	Screw	2
1DGB-73	3807	Washer - Lock	1
1DGB-74	3808	Nut - Lock	1
1DGB-75	103136	Nut - Dog, Screw	3
1DGB-76		Dog	
	130130	Left Hand	1
	103131	Right Hand	1
1DGB-77	103132	Screw - Adjusting, Dog	2


NO.1 RADIUS GRINDING ATTACHMENT
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130B
131A
132A
133A
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135A
137A
138A
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147
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NEW STYLE
OLD STYLE
REF. IDGB-134
REF. IDGB-135
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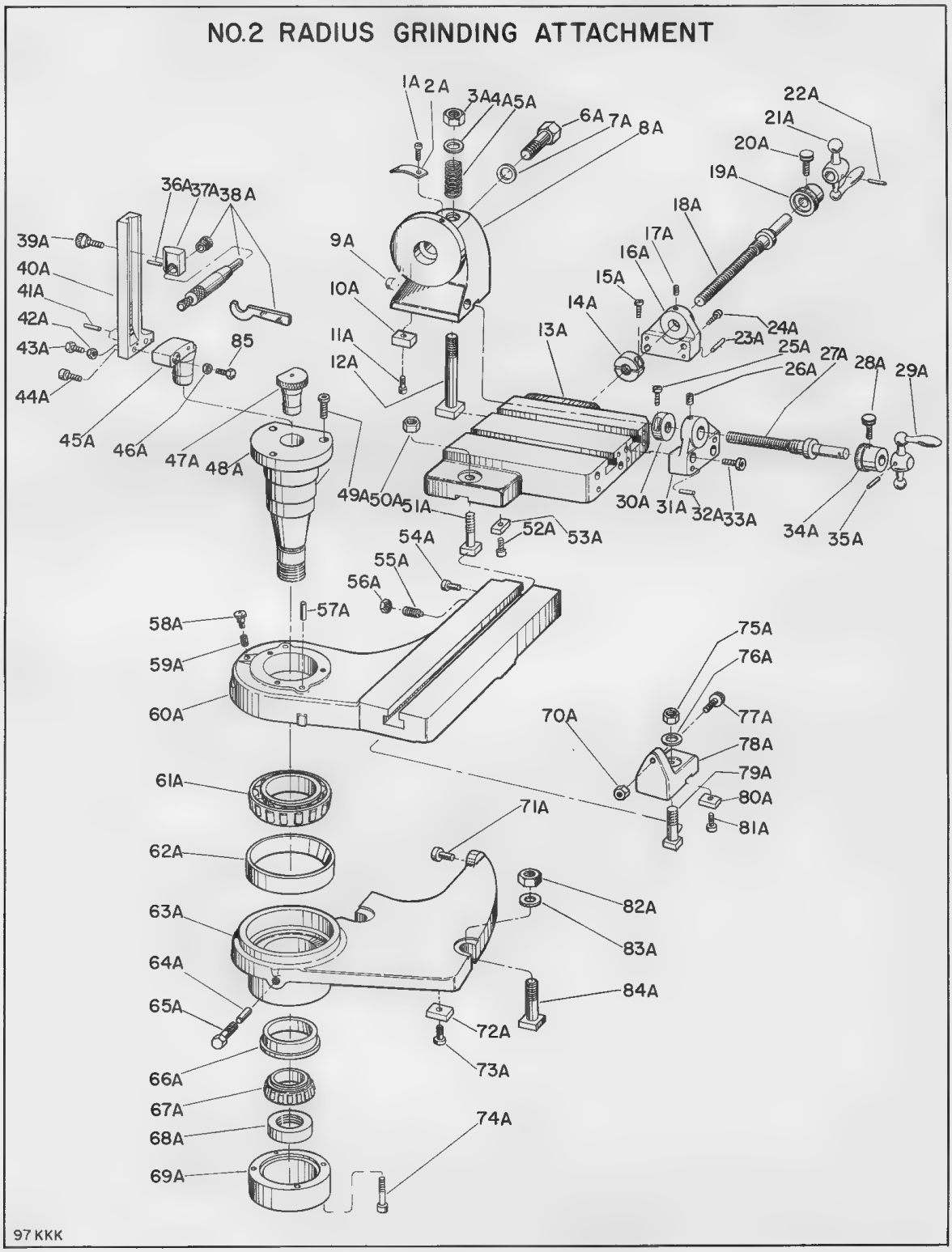
RADIUS GRINDING ATTACHMENT – No.1 – UNIT 1 DGB (Concluded)

KEY NO.	PART NO.	PART NAME	AMT. USED
1DGB-78	2330	Screw . . . . . (c)	4
1DGB-79	109197	Sleeve - In Spindle, 1" to 1-1/4" Shank . . . . . (c)	1
1DGB-80	2358	Screw . . . . . (c)	4
1DGB-81	109189	Extractor - Collet . . . . . (b)	1
1DGB-82	109182	Screw - Thumb . . . . . (b)	1
1DGB-83A	109203	Key - Draw In, Collet . . . . . (d)	1
1DGB-84	109201	Sleeve - Draw In, Collet . . . . . (d)	1
1DGB-85	2330	Screw . . . . . (c)	8
1DGB-86	109195	Sleeve - In Spindle, 3/4" to 7/8" Shank . . . . . (c)	1
1DGB-87		Adapter - Spindle	
	146028	#12 B & S Taper . . . . . (b)	1
	109193	#5 Morse Taper . . . . . (b)	1
1DGB-88	109202	Bolt - Draw In . . . . . (d)	1
1DGB-89	109194	Collar - Stop . . . . . (b)	1
1DGB-90	103129	Knob - Index Pin	1
1DGB-91	140	Pin - Taper	1
1DGB-92	103127	Bushing - Index Lock	1
1DGB-93	253	Spring	1
1DGB-94	103128	Screw - Set, Index Bracket	1
1DGB-95	2160	Pin	1
1DGB-96	103126	Pin - Index Bracket	1
1DGB-97	3304	Pin	2
1DGB-98	3209	Screw	2
1DGB-99	103125	Bracket - Index Pin	1
1DGB-100	103142	Bracket - Centering Gage	1
1DGB-101	103118	Ring - Dust, Front	1
1DGB-102	103119	Cover - Workhead	1
1DGB-103	3203	Screw	4
1DGB-104	103121	Ring - Dust	1
1DGB-105	114528	Sleeve - Dial Setting	1
1DGB-106A	189648	Bearing - Ball	1
1DGB-107	103124	Screw - Clamp Spindle	1
1DGB-108A	189628	Head - Work	1
1DGB-109	60062	Cup - Oil, 1/4"	1
1DGB-110	65815	Plate - Centering Gage	1
1DGB-111	3460	Screw	1
1DGB-112A	189648	Bearing - Ball	1
1DGB-113	3279	Key	1
1DGB-114		Spindle - Workhead	
	146027	#12 B & S Outside Taper	1
	109191	#5 Morse Taper	1

KEY NO.	PART NO.	PART NAME	AMT. USED
1DGB-115	103117	Ring - Dust, Inner Front	1
1DGB-116	1911	Screw (Omit from Standard Attachment)	2
1DGB-120A	403203	Nut - On Spindle	1
1DGB-121	103123	Washer - Felt	1
1DGB-122	103122	Dial - Cutter, Setting	1
1DGB-123	78600	Screw	1
1DGB-124A		Collet - Draw In	
	186652-8	1/8" . . . . . (e)	1
	186652-12	3/16" . . . . . (e)	1
	186652-16	1/4" . . . . . (e)	1
	186652-20	5/16" . . . . . (e)	1
	186652-24	3/8" . . . . . (e)	1
	186652-28	7/16" . . . . . (e)	1
	186652-32	1/2" . . . . . (e)	1
	186652-36	9/16" . . . . . (e)	1
	186652-40	5/8" . . . . . (e)	1
1DGB-125	109192	Clamp - For Sleeve . . . . . (b)	1
1DGB-126	3204	Screw . . . . . (b)	2
1DGB-127		Wrench	
	216584	For #10 Set Screw . . . . . (b)	1
	4047	3/16" Allen . . . . . (b)	1
	4053	1/8" Allen . . . . . (b)	1
1DGB-128	4080	Wrench - 1/2" End . . . . . (a)	1
1DGB-129	2330	Screw . . . . . (a)	1
1DGB-130B	305147	Pulley - Motor . . . . . (a)	1
1DGB-131A	307485	Belt - Extension . . . . . (a)	1
1DGB-132A	307488	Bracket - Motor . . . . . (a)	1
1DGB-133A	234086	Screw . . . . . (a)	2
1DGB-134	Example	*Motor . . . . . (a)	1
1DGB-135A	307487	Plate - Motor . . . . . (a)	1
1DGB-137A	140238	Washer . . . . . (a)	1
1DGB-138A	3251	Screw . . . . . (a)	1
1DGB-139	163646	Plate - Motor (With Robins and Myers Motor) . . . . . (a)	1
1DGB-140	2363	Screw (With Robins and Myers Motor(a)	4
1DGB-141	Example	Screw (Part of Item 134)	1
1DGB-145	2368	Screw	3
1DGB-146	Example	Screw	4
1DGB-147	Example	Washer	4
1DGB-148	3529	Plug	2

*State serial number of machine when ordering parts by name.
( ) Parenthetical suffixes correspond to lettered sections of extra cost equipment in CMMCo. price list under Item 1.

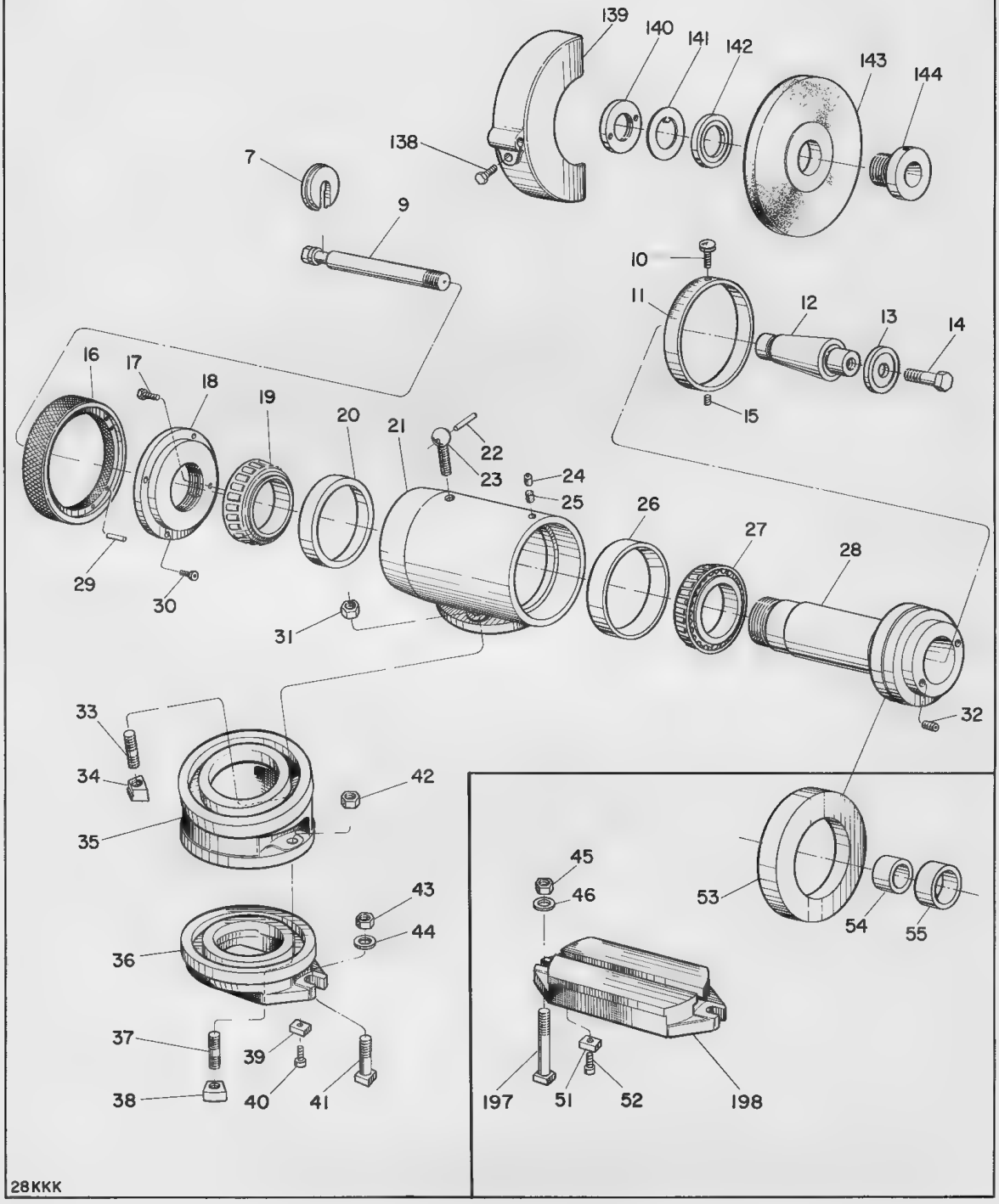
NO.2 RADIUS GRINDING ATTACHMENT



RADIUS GRINDING ATTACHMENT – NO. 2 – UNIT 1 DEJ

KEY NO.	PART NO.	PART NAME	AMT. USED
1DEJ-1A	2285	Screw	2
1DEJ-2A	117090	Scale - On Support	1
1DEJ-3A	3479	Nut	1
1DEJ-4A	3442	Washer	1
1DEJ-5A	3933	Spring	1
1DEJ-6A	2122	Screw	1
1DEJ-7A	1040	Washer	1
1DEJ-8A	176298	Support - Workhead	1
1DEJ-9A	3530	Plug	1
1DEJ-10A	3312	Tongue - Support	2
1DEJ-11A	3486	Screw	2
1DEJ-12A	117092	Bolt - Tee, Support	1
1DEJ-13A	117087	Plate - Top	1
1DEJ-14A	117083	Nut - Adjusting Screw	1
1DEJ-15A	3200	Screw	1
1DEJ-16A	117081	Housing - Adjusting Screw	1
1DEJ-17A	1205	Screw	1
1DEJ-18A	117082	Screw - Adjusting	1
1DEJ-19A		Dial - Adjusting Screw	
	117085	Inch System	1
	117086	Metric	1
1DEJ-20A	2255	Screw - Thumb	1
1DEJ-21A	101842	Crank - Ball	1
1DEJ-22A	2291	Pin	1
1DEJ-23A	1421	Pin	2
1DEJ-24A	3251	Screw	2
1DEJ-25A	3200	Screw	1
1DEJ-26A	1205	Screw	1
1DEJ-27A	117082	Screw - Adjusting	1
1DEJ-28A	2255	Screw - Thumb	1
1DEJ-29A	101842	Crank - Ball	1
1DEJ-30A	117083	Nut - Adjusting Screw	1
1DEJ-31A	117081	Housing - Adjusting Screw	1
1DEJ-32A	1421	Pin	2
1DEJ-33A	3251	Screw	2
1DEJ-34A		Dial - Adjusting Screw	
	117085	Inch System	1
	117086	Metric	1
1DEJ-35A	2291	Pin	1
1DEJ-36A	3540	Pin	1
1DEJ-37A	180274	Holder - Micrometer	1
1DEJ-38A		Micrometer - Barrel	
	117099	Inch System	1
	117094	Metric	1
1DEJ-39A	878	Screw - Thumb	1
1DEJ-40A	180273	Support - Radius Gage	1
1DEJ-41A	3540	Pin	2
1DEJ-42A	3472	Nut	1
1DEJ-43A	3378	Screw	1
1DEJ-44A	3396	Screw	2
1DEJ-45A	127303	Base - Radius Gage	1
1DEJ-46A	3472	Nut	1
1DEJ-47A	117095	Plug - Swivel Shaft	1
1DEJ-48A	117078	Shaft - Swivel	1
1DEJ-49A	3399	Screw	3
1DEJ-50A	3479	Nut	2
1DEJ-51A	3274	Bolt	2
1DEJ-52A	3486	Screw	2
1DEJ-53A	3312	Tongue	2
1DEJ-54A	117080	Pin - Stop	1
1DEJ-55A	3237	Screw	1
1DEJ-56A	3478	Nut	1
1DEJ-57A	1385	Pin	2
1DEJ-58A	44980	Oiler	1
1DEJ-59A	1936	Plug	1
1DEJ-60A	128610	Table - Swivel	1
1DEJ-61A	117076	Cone - Roller Bearing	1
1DEJ-62A	117075	Cup - Roller Bearing	1
1DEJ-63A	117073	Housing - Swivel	1
1DEJ-64A	120362	Pin - Straight	1
1DEJ-65A	52	Screw	1
1DEJ-66A	62189	Cup - Roller Bearing	1
1DEJ-67A	62188	Cone - Roller Bearing	1
1DEJ-68A	227195	Nut - Shoe Type	1
1DEJ-69A	117077	Cover	1
1DEJ-70A	3478	Nut	1
1DEJ-71A	117080	Pin - Stop	1
1DEJ-72A	3312	Tongue	2
1DEJ-73A	3486	Screw	2
1DEJ-74A	3217	Screw	4
1DEJ-75A	3479	Nut	1
1DEJ-76A	3442	Washer	1
1DEJ-77A	97206	Screw - Thumb	1
1DEJ-78A	117096	Stop - Bracket	1
1DEJ-79A	3311	Bolt - Tee	1
1DEJ-80A	3312	Tongue	2
1DEJ-81A	3486	Screw	2
1DEJ-82A	3479	Nut	2
1DEJ-83A	3442	Washer	2
1DEJ-84A	117074	Bolt - Tee	2
1DEJ-85	3378	Screw	1

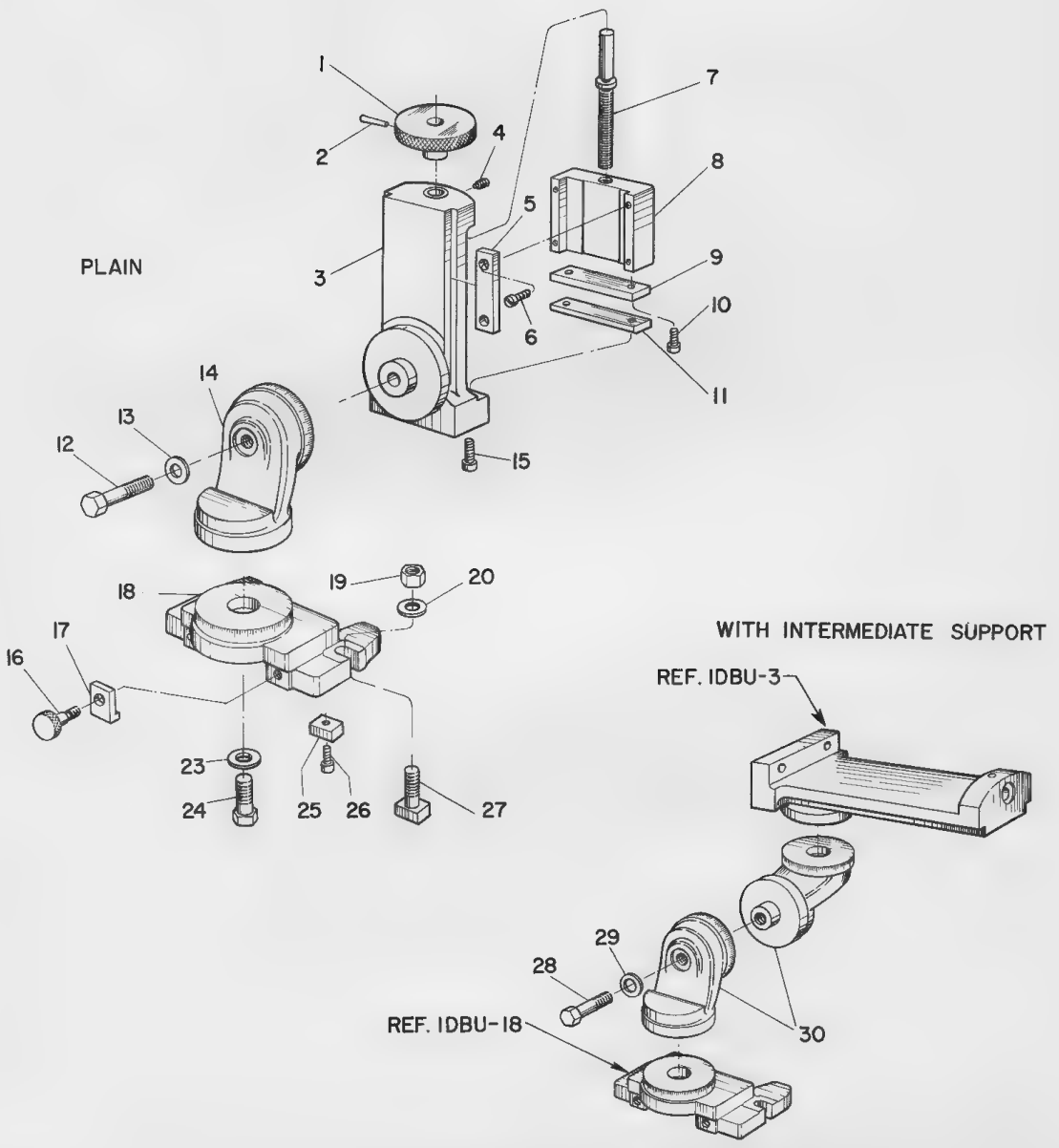
FACE MILL GRINDING ATTACHMENT



FACE MILL GRINDING ATTACHMENT – UNIT 1 DCA

KEY NO.	PART NO.	PART NAME	AMT. USED
1DCA-7	68640	Washer - Draw Bolt	1
1DCA-9	68636	Bolt - Draw	1
1DCA-10	2255	Screw - Thumb	1
1DCA-11	68658	Dial	1
1DCA-12	68637	Arbor	1
1DCA-13	68642	Washer	1
1DCA-14	183	Screw	1
1DCA-15	1786	Screw	1
1DCA-16	68639	Rim - Spindle Nut	1
1DCA-17	2103	Screw	1
1DCA-18	68638	Nut - Adjusting	1
1DCA-19	58587	Cone - Bearing	1
1DCA-20	58588	Cup - Bearing	1
1DCA-21	68648	Head - Work	1
1DCA-22	3537	Handle	1
1DCA-23	3538	Screw	1
1DCA-24	69583	Cup - Oil	2
1DCA-25	1936	Plug - Felt	2
1DCA-26	57889	Cup - Bearing	1
1DCA-27	56867	Cone - Bearing	1
1DCA-28	71886	Spindle	1
1DCA-29	3541	Pin	1
1DCA-30	3484	Screw	4
1DCA-31	3479	Nut	2
1DCA-32	1215	Screw	2
1DCA-33	92861	Stud	2
1DCA-34	68644	Clamp	2
1DCA-35	68645	Plate - Angle	1
1DCA-36	68646	Base	1
1DCA-37	92861	Stud	2
1DCA-38	68644	Clamp	2
1DCA-39	3312	Tongue	2
1DCA-40	3486	Screw	2
1DCA-41	3311	Bolt - Tee	2
1DCA-42	3479	Nut	2
1DCA-43	3479	Nut	2
1DCA-44	3442	Washer	2
1DCA-45	3479	Nut	2
1DCA-46	3442	Washer	2
1DCA-51	3312	Tongue	2
1DCA-52	3486	Screw	2
1DCA-53	68659	Plate - Adapter	1
1DCA-54	68661	Bushing - Arbor	1
1DCA-55	68662	Bushing - Arbor	1
1DAW-138	49	Screw	1
1DAW-139	65376	Guard	1
1DAW-140	157756	Nut - Collet	1
1DAW-141	188829	Washer - Lock	1
1DAW-142	157755	Collar - Spacing, 3/8"	1
1DAW-143	74012	Wheel - Grinding 8 x 1/16 x 1-1/4 Straight Side	1
1DAW-144	188705	Collet	1
1DJF-197	68660	Bolt - Block Raising	2
1DJF-198	68663	Block - Raising	1

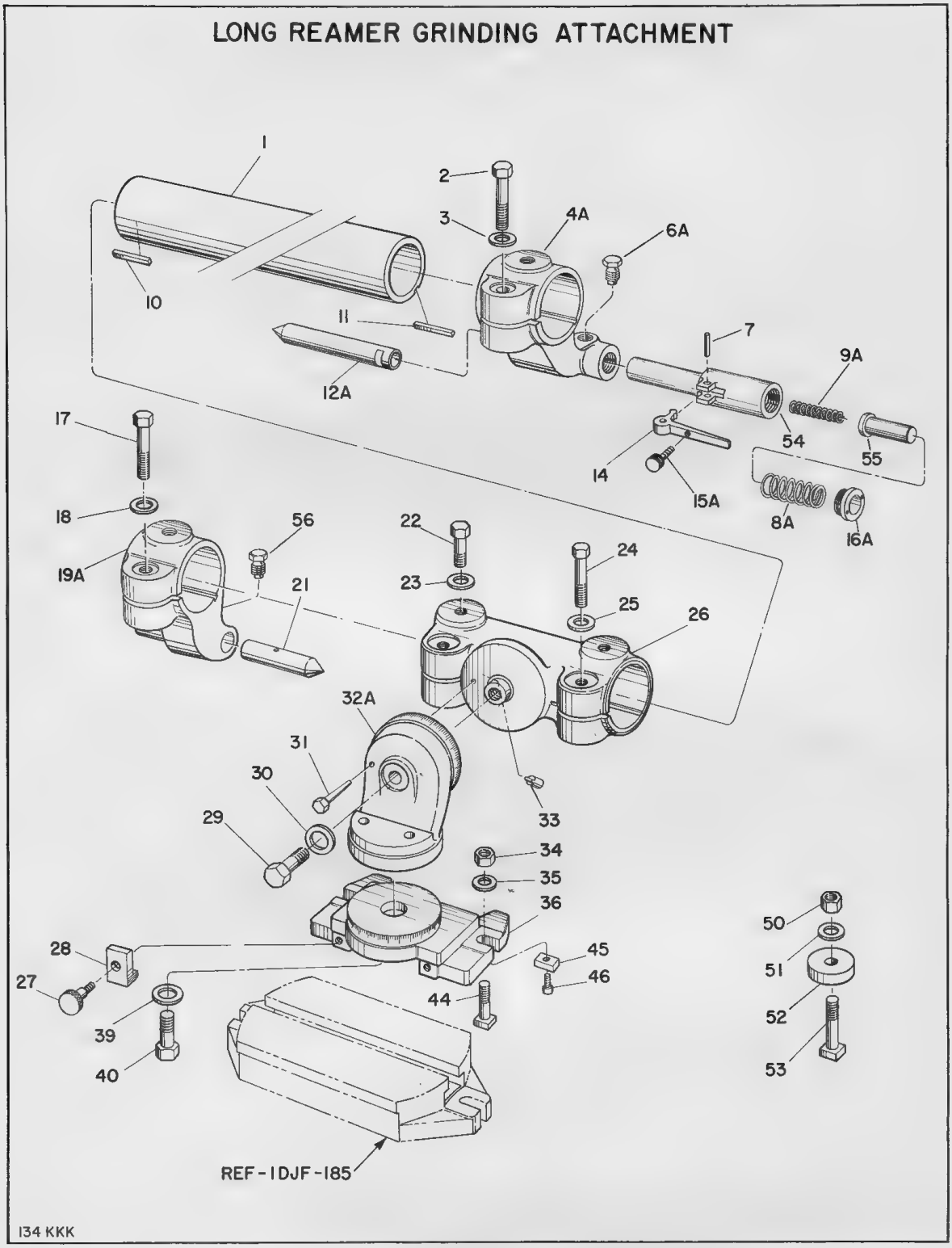
SURFACE GRINDING ATTACHMENT



SURFACE GRINDING ATTACHMENT – UNIT 1 DBU

KEY NO.	PART NO.	PART NAME	AMT. USED	KEY NO.	PART NO.	PART NAME	AMT. USED
1DBU-1	102480	Knob - On Screw	1	1DBU-15	3495	Screw	2
1DBU-2	141	Pin - Taper	1	1DBU-16	159914	Screw	2
1DBU-3	62563	Body - Surface Grinding Attachment	1	1DBU-17	159913	Clamp - Workhead	2
1DBU-4	1205	Screw	1	1DBU-18	156160	Plate - Workhead	1
1DBU-5	62494	Clamp - Vise	2	1DBU-19	3479	Nut	2
1DBU-6	3486	Screw	4	1DBU-20	3442	Washer	2
1DBU-7	62493	Screw - Vise	1	1DBU-23	1040	Washer	1
1DBU-8	62491	Slide	1	1DBU-24	3428	Screw	1
1DBU-9	7319	Jaw - On Housing	1	1DBU-25	3312	Tongue	2
1DBU-10	1145	Screw	2	1DBU-26	3486	Screw	2
1DBU-11	62492	Jaw - Body	1	1DBU-27	3311	Bolt - Tee	2
1DBU-12	3427	Screw	1	1DBU-28	3427	Screw	1
1DBU-13	1040	Washer	1	1DBU-29	1040	Washer	1
1DBU-14	62700	Support - Vise Body	1	1DBU-30	62700	Support - Vise	2

LONG REAMER GRINDING ATTACHMENT



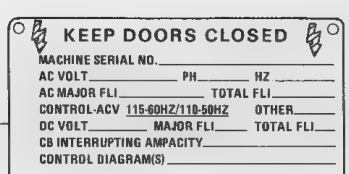
LONG REAMER GRINDING ATTACHMENT – UNIT 1 DBZ

KEY NO.	PART NO.	PART NAME	AMT. USED
1DBZ-1	46252	Bar - Adjusting	1
1DBZ-2	1953	Screw	1
1DBZ-3	1035	Washer	1
1DBZ-4A	191661	Bracket - Tailstock	1
1DBZ-6A	143741	Screw	1
1DBZ-7	3542	Pin	1
1DBZ-8A	143747	Spring	1
1DBZ-9A	150021	Spring	1
1DBZ-10	1448	Key	1
1DBZ-11	1448	Key	1
1DBZ-12A	143744	Center - Tailstock	1
1DBZ-14	143740	Lever - For Tailstock	1
1DBZ-15A	77200	Screw	1
1DBZ-16A	143748	Cap	1
1DBZ-17	1953	Screw	1
1DBZ-18	1035	Washer	1
1DBZ-19A	191660	Bracket - Headstock	1
1DBZ-21A	64099	Center - Headstock	1
1DBZ-22	383	Bolt	1
1DBZ-23	1035	Washer	1
1DBZ-24	1953	Screw	1
1DBZ-25	1035	Washer	1
1DBZ-26	66797	Carrier - Bar	1
1DBZ-27	159914	Screw	2
1DBZ-28	159913	Clamp - Workhead	2
1DBZ-29	3427	Screw	1
1DBZ-30	1040	Washer	1
1DBZ-31	83432	Pin - Locating	1
1DBZ-32A	66798	Support - Workhead	1
1DBZ-33	38103	Pin - In Bar Carrier	1
1DBZ-34	3479	Nut	2
1DBZ-35	3442	Washer	2
1DBZ-36	156160	Plate - Workhead	1
1DBZ-39	1040	Washer	1
1DBZ-40	3428	Screw	1
1DBZ-44	3311	Bolt - Tee	2
1DBZ-45	3312	Tongue	2
1DBZ-46	3486	Screw	2
1DBZ-50	3479	Nut	1
1DBZ-51	3442	Washer	1
1DBZ-52	46249	Collar - Tooth Rest	1
1DBZ-53	3309	Bolt - Tee	1
1DBZ-54	143746	Housing - Tailstock	1
1DBZ-55	143749	Plunger - Spring	1
1DBZ-56	143741	Screw	1

INSTRUCTION PLATES

1

2



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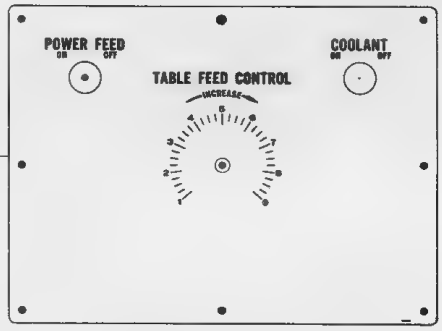

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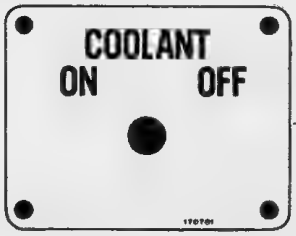

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INSTRUCTION PLATES

KEY NO.	PART NO.	PART NAME	AMT. USED
1	3966	Plate - Name, Cincinnati	1
2	313696	Plate - Spindle Direction	1
3	316056	Plate - Control	1
4	195338	Plate - Radius Grind, "On" and "Off"	1
5		Plate - Instruction, Crossfeed Screw	
	156821	English	1
	196478	Symbolized	1
6	181913	Plate - Instruction, 50 Hz	1
7	167308	Plate - Instruction, 60 Hz	1
8		Plate - Electrical Direction, 24" Table Travel With Power Feed	
	173032	With or Without Coolant	1
	196482	Symbolized	1
	159997	Alteration - With or Without Coolant, with Radius Grinding Attachment and End Mill Grinding Attachment	1
9	170781	Plate - Coolant "On" and "Off"	1

For other plates see RP-30

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